STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

IN THE MATTER OF

BANGOR HYDRO-ELECTRIC COMPANY BRADLEY, EDDINGTON, OLD TOWN, ORONO &VEAZIE, PENOBSCOT COUNTY, MAINE BASIN MILLS HYDRO PROJECT #L-16880-35-D-N (APPROVAL)	) MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT;) MAINE WATER QUALITY PROGRAM;) FEDERAL CLEAN WATER ACT)) NEW PERMIT AND WATER QUALITY CERTIFICATION

FINDINGS OF FACT AND ORDER

APPROVING

THE

BASIN MILLS HYDRO PROJECT

ISSUED BY THE

BOARD OF ENVIRONMENTAL PROTECTION

NOVEMBER 10, 1993

TABLE OF CONTENTS

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BOARD ORDER

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Pursuant to the provisions of 38 MRSA § 464 and §§ 630-637, 06-096 CMR Chapter 450 ("Administrative Rules for Hydropower Projects," effective date September 31, 1987), and Section 401 of the Federal Water Pollution Control Act (the "Clean Water Act"), the Board of Environmental Protection has considered the application of BANGOR HYDRO-ELECTRIC COMPANY with its supportive data, agency review comments, public hearing record, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. APPLICATION SUMMARY

The applicant proposes to construct and operate the Basin Mills Hydro Project, located on the Penobscot and Stillwater Rivers in the Towns of Bradley, Eddington, Orono and Veazie and the City of Old Town, Penobscot County, Maine (see Exhibits 1 and 2). The proposed project consists of three elements: (1) the expansion and continued operation of the existing Veazie Development; (2) the construction and operation of the new Basin Mills Development; and (3) the decommissioning of the existing Orono Development.

2. PROCEDURAL HISTORY

On July 20, 1990, Bangor Hydro-Electric Company filed an Application for Project Approval Under the Maine Waterway Development and Conservation Act and Water Quality Certification for the proposed Basin Mills Project. The application was deemed acceptable for processing by the Department on August 6, 1990.

The application was withdrawn on July 19, 1991 and refiled on July 22, 1991. The purpose of this withdrawal and refiling was to establish a new one-year period for action on the request for water quality certification while the applicant continued to provide the additional information required on the project.

The application was again withdrawn on March 23, 1992 and refiled on March 24, 1992. The purpose of this withdrawal and refiling was to establish a new one-year period for action on the request for water quality certification while the Department reviewed the additional information provided by the applicant and held a public hearing on the project.

On April 6, 1992, the Department determined that the applicant had complied with all outstanding requests for additional information on the application.

On June 24, 1992, the Board voted to assume jurisdiction over the application and to post the project to a public hearing. Notice of

the Board's adjudicatory hearing on the application was subsequently provided by mail, by newspaper publication, by press release and by public service radio and television announcements in accordance with the Maine Administrative Procedures Act, 5 M.R.S.A. § 9051-A. On September 23, 1992, the Board granted intervenor status to twenty-three organizations and individuals. These intervenors were subsequently consolidated into four groups, as follows:

- Friends of Basin Mills (including Friends of Basin Mills, Maine Chamber of Commerce and Industry, Associated General Contractors of Maine, Penquis Community Action Program, Shaw & Tenney, Record Quest Guides, and Richard Hill);
- EMDC and Municipalities (including Eastern Maine Development Corporation, Town of Bradley, Town of Eddington, Town of Orono, and Town of Veazie);
- Conservation Intervenors (including Atlantic Salmon Federation, Maine Council of the Atlantic Salmon Federation, American Rivers, Maine Audubon Society, Sportsman's Alliance of Maine, Trout Unlimited, Maine Council of Trout Unlimited, Sierra Club, Conservation Law Foundation of New England, and Natural Resources Council of Maine); and
- Penobscot Indian Nation.

The Board held a public hearing on the application on December 7-11, 1992 in Bangor, on January 11-14, 1993 in Augusta, and on February 1-3, 1993 in Bangor. The hearing included a total of twelve days of testimony and cross-examination by the parties and seven evenings of public comments. The hearing record remained open for written comments from the public through February 5, 1993.

The application was again withdrawn on March 23, 1993 and refiled on March 24, 1993. The purpose of this withdrawal and refiling was to establish a new one-year period for action on the request for water quality certification while the Department continued its review of the project following the close of the public hearing record.

3. EXISTING PROJECT FEATURES

a. Veazie Development. The existing Veazie Development consists of a dam, fishway facilities, an impoundment, two powerhouses, and appurtenant facilities (see Exhibit 3). The site was originally developed as a pulp mill operation prior to 1886 and was converted to a hydroelectric facility in 1891.

i. Veazie Dam. The Veazie Dam is located in Eddington and Veazie about 3 miles upstream from the breached Bangor Waterworks Dam. The Veazie Dam is an 893-foot-long concrete dam with a maximum height of about 25 feet. The main east-west spillway sections are topped with 6.5-foot-high hinged wooden flashboards. The north-south forebay section is topped with 3-foot-high wooden flashboards.

ii. Fishways. An abandoned pool-type fishway is located at the easterly end of the dam. A vertical slot fishway and trap facilities are located in the middle of the river between the

overflow sections of the dam. The fishway and trap facilities are owned by the State of Maine.

iii. Impoundment. The impoundment created by the Veazie Dam has a surface area of 390 acres at a full pond elevation of 34.8 feet mean sea level (MSL). This impoundment has a mean depth of about 15 feet, and extends upstream about 3.8 miles at normal river flows.

iv. Plant A Powerhouse. The Plant A powerhouse is a wood and masonry structure located along the west bank of the river and in-line with the forebay section of the dam. The powerhouse was originally built in 1886 and measures 239 feet long by 113 feet wide. The powerhouse contains 15 turbine-generator units with a total installed capacity of 5.4 megawatts (MW) at a normal operating head of 18 feet. Total hydraulic capacity of the Plant A turbines is 5,100 cubic feet per second (cfs).

v. Plant B Powerhouse. The Plant B powerhouse is a brick and concrete structure located immediately south of plant A, at the downstream end of the forebay section of the dam. This powerhouse was built in 1938 and measures 60 feet long by 76 feet wide. The powerhouse contains 2 turbine-generator units with a total installed capacity of 3.0 MW at a normal operating head of 18 feet. Total hydraulic capacity of the Plant B turbines is 2,400 cfs.

b. Basin Mills Development. The Basin Mills site is the location where a timber crib dam was built in the late 1800's. This dam breached during a flood in 1936 and has subsequently unraveled and eroded to the point that no significant evidence of the structure remains.

c. Orono Development. The existing Orono Development consists of a dam, an impoundment, headworks, penstocks, powerhouse, and tailrace (see Exhibit 4). The original development was constructed in about 1898 as part of a pulp mill operation. In 1949, the development was purchased by the applicant and converted to electric generation.

i. Orono Dam. The Orono Dam is located on the Stillwater River just upstream of its confluence with the Penobscot River. The dam, which was reconstructed in 1960, consists of a series of concrete overflow and non-overflow sections of various heights with a total length of about 1,174 feet. The main spillway section is 320 feet long and is topped by 2.4-foot-high breakaway wooden flashboards.

ii. Impoundment. The impoundment created by the Orono Dam has a surface area of 175 acres at a full pond elevation of 72.4 feet MSL. This impoundment extends upstream about 2 1/2 miles to the tailrace of the Stillwater Project, which is licensed to the applicant.

iii. Headworks. The headworks consist of a concrete intake structure, headgates and trashracks located at the south end of the dam. The headworks divert water to the penstocks.

iv. Penstocks. Three 10-foot-diameter steel and wood stave penstocks carry water from the dam to the powerhouse, located 836 feet downstream of the headworks.

v. Powerhouse. The powerhouse is a masonry structure that measures 150 feet long by 150 feet wide. The structure contains 4 turbine-generator units with a total installed capacity of 2.3 MW at a normal operating head of 25 feet. Total hydraulic capacity of the development is 1,740 cfs.

vi. Tailrace. Water passing through the Orono turbines discharges into a tailrace that delivers the flow to the Penobscot River just downstream of the mouth of the Stillwater River.

4. EXISTING OPERATION

a. Veazie. The Veazie Development is operated as a run-of-river facility, with inflow to the impoundment equal to outflow from the dam and powerhouse on an instantaneous basis. At inflows of less than 7,500 cfs, the units in the Plant A and Plant B powerhouses are operated on the basis of available flows, maintenance requirements, and fish passage considerations. At inflows of more than 7,500 cfs, all units are on-line and water in excess of total turbine capacity is spilled at the dam. The spillway flashboards begin to fail when overtopped by about a foot and a half of water. Inflows exceed the total hydraulic capacities of Plant A and Plant B about 70% of the time.

Flows enter the Plant A powerhouse at a right angle to the river. Water is then discharged from the turbines back to the main river channel through individual tailraces which extend beneath an elevated concrete forebay floor.

Flows enter the Plant B powerhouse by passing through two radial gates located at the downstream end of the forebay. Water is discharged downstream from the powerhouse along the west shore of the river.

b. Basin Mills. There are no existing facilities at the Basin Mills site.

c. Orono. The Orono Development is operated as a run-of-river facility, with inflow to the impoundment equal to outflow from the dam and powerhouse on an instantaneous basis. The 4 units in the powerhouse are operated on the basis of available flows and maintenance requirements. At inflows of more than 1,740 cfs, all units are on-line and water in excess of total turbine capacity is spilled at the dam. The spillway flashboards begin to fail when overtopped by about 1 1/2 feet of water. Inflows exceed the hydraulic capacity of the powerhouse about 35% of the time.

The Orono Development diverts generating flows from the natural course of the Stillwater River between the dam and the confluence with the Penobscot river. This bypass channel, which is about 5 acres in size, currently receives only leakage flows or spillage in excess of turbine capacity.

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5. PROPOSED FACILITIES

a. Veazie. The applicant proposes to expand the existing Veazie Development by constructing a third powerhouse (Plant C) at the easterly (Eddington) end of the dam (see Exhibit 5). The new powerhouse will be a concrete structure measuring about 153 feet long by 63 feet wide. The powerhouse will contain a single vertical Kaplan turbine-generator unit with an installed capacity of 8.0 MW at a normal operating head of 18 feet. The hydraulic capacity of the Plant C turbine will be about 6,000 cfs. Flows will enter and exit the new powerhouse via excavated forebay and tailrace channels. Ancillary civil works will include a new access road from Monument Drive in Eddington, a new substation, and various facilities designed to mitigate project impacts.

b. Basin Mills. The applicant proposes to construct a new dam and powerhouse at the Basin Mills site, located between the mouth of the Stillwater River and Ayers Island in the Penobscot River at the normal upstream limit of the Veazie impoundment, along with various ancillary civil works (see Exhibit 6). The dam will create a new impoundment in the river.

i. Basin Mills Dam. The new dam, which will span the Penobscot River between Orono and Bradley, will be a concrete gravity structure about 1,640 feet long with an average height of about 18 feet as measured from the riverbed. The dam will include a 1,250-foot-long overflow spillway section topped by 6.0-foot-high hinged steel flashboards, and a gated spillway section with five 30-foot-wide by 20-foot-high radial gates. The dam will divert flows to a new powerhouse via excavated headrace and forebay channels along the easterly side of the river.

ii. Powerhouse. The new powerhouse will be a concrete structure located about 250 feet east of the existing riverbank in the Town of Bradley. The powerhouse will measure about 169 feet long by 154 feet wide and will extend up about 114 feet from a minimum foundation elevation of -7.0 feet MSL (about 52 feet below the existing riverbed at the dam site). Preliminary design plans call for the powerhouse to contain 3 full-Kaplan turbine-generator units with a total installed capacity of 38 MW at a head of 26 feet. Total hydraulic capacity of the development will be about 20,000 cfs. Flows from the turbines will re-enter the river via an excavated tailrace channel.

iii. Impoundment. The dam will create a new impoundment with a surface area of about 292 acres at a full pond elevation of 64.0 feet MSL. The impoundment will have a mean depth of about 18 feet, and will extend upstream on the Stillwater River to the Orono Dam and on the Penobscot River about 3.6 miles to the tailrace of the Great Works Project, which is located in Bradley and the City of Old Town and is licensed to the James River Company. The physical characteristics (size, depth, flushing rate) of the new impoundment will be virtually identical to those of the existing Veazie impoundment.

iv. Ancillary Civil Works. Ancillary civil works will include new permanent access roads, a new substation and transmission line,

earthen flood control dikes and fill areas, riprap erosion protection, and various facilities designed to mitigate project impacts.

c. Orono. The construction of the Basin Mills Dam will result in the inundation of the existing Orono powerhouse and penstocks and will reduce the available head at the dam to about 8 feet. As a result, the applicant proposes to decommission and remove all existing power generating facilities and structures. The applicant further proposes to continue to maintain the existing dam in order to maintain the existing impoundment.

6. PROPOSED CONSTRUCTION ACTIVITIES

a. Veazie. The substance and sequence of the construction activities proposed at Veazie are detailed in the application (Volume I, Exhibit C; Volume XIV; and the February 1991 Erosion and Sedimentation Control Plan).

Construction of the Plant C expansion will take place in the dry behind temporary cofferdams placed around the easterly end of the Veazie Dam. Plants A and B and the existing fishway will remain in operation throughout the construction period.

The proposed expansion will require the excavation of about 53,250 cubic yards (c.y.) of rock and 8,500 c.y. of soil, and the removal of about 600 c.y. of concrete from the existing dam and abandoned fishway. A temporary access road to the Basin Mills powerhouse area will be constructed to facilitate spoils disposal and stockpiling. Construction activities will require about 35,000 c.y. of granular fill and gravel for temporary cofferdams and temporary and permanent access roads. About 12,000 c.y. of concrete will be required to construct the new powerhouse and fishway facilities.

Final design and construction activities for the Plant C expansion will commence following the receipt of all required regulatory approvals and will be complete in 3 to 3 1/2 years. The expansion is expected to go on-line no earlier than 1999.

b. Basin Mills. The substance and sequence of the construction activities proposed at Basin Mills are detailed in the application (Volume I, Exhibit C; Volume XIV; and the February 1991 Erosion and Sedimentation Control Plan).

Construction of the new Basin Mills Dam and powerhouse will occur in three stages. The first stage will involve construction of the gated spillway section on the westerly side of the river and excavation of the powerhouse, tailrace and forebay areas on the easterly side of the river. These activities will take place in the dry behind temporary cofferdams. During this stage, the Orono powerhouse will be demolished and the penstocks removed.

The second stage will involve construction of part of the overflow spillway section of the dam, proceeding in blocks from west to east. This will take place in the dry behind temporary cofferdams extending from the easterly side of the river across to the gate section. The first stage cofferdam will be removed to allow river

flows to be passed through the finished gate section. The second stage will also involve construction of the powerhouse and adjacent overflow spillway blocks.

The third stage will involve removal of the stage two cofferdam and construction of a smaller cofferdam near the easterly side of the river. This will allow construction of the remaining overflow spillway blocks and completion of headrace excavations while allowing river flows to be passed over the completed spillway blocks.

The proposed construction will require the excavation of about 80,000 c.y. of rock and 620,000 c.y. of soil. About 84,000 c.y. of concrete will be required to construct the new dam and powerhouse.

Final design for the Basin Mills Development will commence with the start of on-site construction at Veazie. Construction of Basin Mills will commence following the completion of work on Veazie and will be complete in 3 to 4 years. The new project is expected to go on-line no earlier than 2002.

7. PROPOSED OPERATION

a. Veazie. The applicant proposes to continue to operate the expanded Veazie Development as a run-of-river facility, and to sequence the operation of all eighteen Plant A, B and C units to maximize fish passage at the site while maintaining or enhancing fish habitat and fishing opportunity below the dam. The applicant proposes the following operating regime:

FLOWS	PLANTS/UNITS OPERATING
Up To 6,000 cfs	Plant C/Unit #18
6,000-6,950 cfs	Above plus Plant A/Units #1&6
6,950-8,160 cfs	Above plus Plant B/Unit #17
8,160-9,170 cfs	Above plus Plant A/Units #2-5&7
9,170-10,920 cfs	Above plus Plant B/Unit #16
10,920-13,525 cfs	Above plus Plant A/Units #8-15

Flows in excess of total turbine capacity of 13,525 cfs will be spilled at the dam. Inflows will exceed this capacity about 31% of the time.

b. Basin Mills. The applicant proposes to operate the Basin Mills Development as a run-of-river facility, with the three generating units operating on the basis of available flows and within the limits of two hydraulic constraints. First, the impoundment elevation will be regulated so as not to raise existing tailwater elevations at the upstream Great Works Project. This means that at flows of less than about 20,000 cfs, the impoundment will be drawn down by varying amounts to duplicate existing tailwater levels at the Great Works Project under all flow conditions. The amount of the drawdown under 7Q10 drought conditions (flow of 3,790 cfs) will be about 2.6 feet, or to elevation 61.4 feet MSL, at the dam.

Second, the dam will be designed and operated so that the hydraulic capacity of the gated and ungated spillway sections will

keep flood levels in areas susceptible to flooding under existing conditions from exceeding their historic elevations.

Flows in excess of total turbine capacity of 20,000 cfs will be passed through the spillway gates (up to a design flow of about 40,000 cfs) and then will be spilled at the dam. The spillway flashboards will begin to fail when overtopped by about 1 1/2 feet of water. Inflows will exceed total turbine capacity about 19% of the time.

c. Orono. The applicant proposes to maintain the Orono Dam in order to maintain the existing impoundment for recreational use and to preserve the existing natural resources of the area.

8. JURISDICTION

a. Water Quality Certification. The proposed construction and operation of the Basin Mills Project qualifies as an "activity...which may result in [a] discharge into the navigable water [of the United States]" under the Clean Water Act (CWA), 33 U.S.C. § 1251 et. seq. Section 401 of the CWA requires that any applicant for a federal license or permit to conduct such an activity obtain a certification that the activity will comply with applicable State water quality standards. Certification is deemed to be waived if the State expressly waives its authority to act or otherwise fails to act within one year of receipt of a request for certification.

The Veazie Project is licensed as a water power project under the Federal Power Act (Project No. 2304). The initial project license was issued on February 18, 1965 and was originally set to expire on December 31, 1987. At Bangor Hydro's request, the expiration date of the license was accelerated to September 25, 1985.

The Orono Project is licensed as a water power project under the Federal Power Act (Project No. 2710). The initial project license was issued on November 10, 1977 and was originally set to expire on December 31, 1993. At Bangor Hydro's request, the expiration date of the license was accelerated to September 25, 1985.

The proposed Basin Mills Dam and ancillary facilities are subject to licensing as a water power project under the Federal Power Act.

Bangor Hydro has filed an Application for License to construct and operate the Basin Mills Project, including the expansion of the Veazie Development, the construction of the Basin Mills Development, and the decommissioning of the Orono Development, for a term of 50 years. This application is currently pending before the Federal Energy Regulatory Commission (FERC)(Project No. 10981). In accordance with FERC Relicensing Regulations, the Veazie and Orono Projects are currently operating with annual licenses which will be automatically renewed each year until a relicensing decision is made on these projects.

The Department of Environmental Protection has been designated by the Governor of the State as the certifying agency for issuance of Section 401 Water Quality Certification for all activities located

in whole or in part in organized municipalities subject to the Department's regulatory jurisdiction.

b. Hydropower Project Permit. The proposed expansion of the Veazie Development, construction of the Basin Mills Development, and decommissioning of the Orono Development each qualify as the "construction, reconstruction or structural alteration of a hydropower project" under the Maine Waterway Development and Conservation Act (MWDCA), 38 M.R.S.A. Section 630 et. seq. Section 633 of the MWDCA requires that a permit be obtained prior to the initiation of such activities. Because the proposed activities are located in organized municipalities, they are subject to the permitting jurisdiction of the Department under the terms of the MWDCA.

c. Terms and Conditions. Section 401(d) of the CWA provides that a water quality certification shall set forth any limitations necessary to assure that an applicant for a federal license or permit will comply with any appropriate requirement of state law, and that such limitations shall become a condition on the federal license or permit issued for the activity. As discussed above, a permit is required under Maine law for the proposed expansion, construction, and decommissioning of the Veazie, Basin Mills and Orono Developments, respectively. The Maine Waterway Development and Conservation Act is a state water quality-related law. Consequently, the terms and conditions of any MWDCA permit issued for this project constitute appropriate and necessary limitations to be set forth in any certification issued for this project.

9. APPLICABLE WATER QUALITY STANDARDS

The waters of the main stem Penobscot River are currently classified as Class B waters from the confluence of the Piscataquis River in Howland, including the Stillwater Branch and all impoundments, to the Maine Central Railroad bridge in Bangor-Brewer, and as Class C waters from this point to the confluence of Reeds Brook in Hampden. 38 MRSA § 467(7)(A).

The statutory water quality standards applicable to these waters are listed below.

a. Designated Uses.

i. Class B. Class B waters are to be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; and navigation; and as habitat for fish and other aquatic life. The habitat is characterized as unimpaired. 38 MRSA § 465(3)(A).

ii. Class C. Class C waters are to be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section

403; and navigation; and as habitat for fish and other aquatic life. 38 MRSA §. 465(4)(A).

b. Numeric Standards.

i. Class B. The dissolved oxygen content of Class B waters is to be not less than 7 parts per million or 75% of saturation, whichever is higher, except that for the period from October 1st to May 14th, the 7-day mean dissolved oxygen concentration is to be not less than 9.5 parts per million and the 1-day minimum dissolved oxygen concentration is to be not less than 8.0 parts per million in identified fish spawning areas. 38 MRSA § 465(3)(B).

ii. Class C. The dissolved oxygen content of Class C waters is to be not less than 5 parts per million or 60% of saturation, whichever is higher, except that in identified salmonid spawning areas where water quality is sufficient to ensure spawning, egg incubation and survival of early life stages, water quality sufficient for these purposes is to be maintained. 38 MRSA § 465(4)(B).

c. Narrative Standards.

i. Class B. Discharges to Class B waters are not to cause adverse impacts to aquatic life in that the receiving waters must be of sufficient quality to support all aquatic species indigenous to the receiving waters without detrimental changes in the resident biological community. 38 MRSA § 465(3)(C).

The habitat characteristics and aquatic life criteria of Class B are deemed to be met in an existing impoundment classified B if the impounded waters achieve the aquatic life criteria of Class C, provided that any reasonable changes are implemented that do not significantly affect existing energy generation capability and would result in improvement in the habitat and aquatic life of the impounded waters, and further provided that, where the actual quality of the impounded waters attains any more stringent habitat characteristic or aquatic life criteria than required under the assigned classification, the existing water quality must be maintained and protected. 38 MRSA § 464(10).

ii. Class C. Discharges to Class C waters may cause some changes to aquatic life, provided that the receiving waters are of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community. 38 MRSA § 465(4)(C).

The habitat characteristics and aquatic life criteria of Class C are deemed to be met in an existing impoundment classified C, provided that any reasonable changes are implemented that do not significantly affect existing energy generation capability and would result in improvement in the habitat and aquatic life of the impounded waters. Where the actual water quality of the impounded waters attains any more stringent habitat characteristic or aquatic life criteria than that required

under the assigned classification, the existing water quality must be maintained and protected. 38 MRSA § 464(10).

iii. Lower Penobscot River. The free-flowing habitat of the Penobscot River segment from the Veazie Dam, but not including the Veazie Dam, to the confluence of Reeds Brook in Hampden provides irreplaceable social and economic benefits and this use must be maintained. 38 MRSA § 467(7)(A)(5).

iv. New Construction. A hydropower project constructed after June 30, 1992 may cause some change to the habitat and aquatic life of the project's impoundment and the waters immediately downstream of and measurably affected by the project, so long as the habitat and aquatic life criteria of those waters' assigned classification are met. 38 MRSA § 464(4)(H).

d. Antidegradation. The State's antidegradation policy is governed by the following statutory provisions.

i. Existing in-stream water uses and the level of water quality necessary to protect those existing uses must be maintained and protected.

ii. Where high quality waters of the State constitute an outstanding national resource, that water quality must be maintained and protected.

iii. The Department may only approve water quality certification if the standards of classification of the waterbody and the requirements of the State's antidegradation policy will be met.

iv. Where the actual quality of the classified water exceeds the minimum standards of the next highest classification, that higher water quality must be maintained and protected.

v. The Department may only approve water quality certification which would result in lowering the existing quality of any waterbody after making a finding that the action is necessary to achieve important economic or social benefits to the State.

38 MRSA § 464(4)(F)(1)-(5).

10. MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT

a. Approval Criteria. Under the MWDCA, the Department must approve a project when it finds that:

(1) The applicant has the financial capability and technical ability to undertake the project;

(2) The applicant has made adequate provisions for protection of public safety;

(3) The project will result in significant economic benefits to the public;

(4) The applicant has made adequate provisions for traffic movement into or out of the development area;

(5) The project is consistent with Land Use Regulation Commission zoning, where applicable;

(6) The applicant has made reasonable provisions to realize the environmental benefits and mitigate the adverse environmental impacts of the project;

(7) The advantages of the project are greater than the direct and cumulative adverse impacts over the life of the project based on specified environmental and energy considerations. These considerations include whether the project will result in: significant benefit or harm to soil stability, wetlands, the natural environment of surface waters and their shorelands, fish and wildlife resources, historic and archaeological resources, and public access to and use of surface waters; significant flood control benefits or flood hazards; and significant hydroelectric energy benefits; and

(8) There is a reasonable assurance that the project will not violate applicable water quality standards.

38 MRSA § 636.

b. Applicability. The Board finds, based on undisputed evidence in the record, that there is no hydraulic connection between the Veazie and Basin Mills developments. Thus, while there are certain economic and scheduling efficiencies in building the projects together, each development is independent of the other, and each can be constructed and operated without the other being built. Therefore, the Board finds that each proposed development must independently satisfy all approval criteria of the MWDCA.

11. FINANCIAL CAPABILITY AND TECHNICAL ABILITY

a. Project Costs.

i. Veazie. The estimated construction cost for the proposed Veazie Plant C expansion is $24.5 million in 1989 dollars. This estimated cost becomes $31.5 million when escalated to the proposed in-service date of 1996.

ii. Basin Mills. The estimated construction cost for the proposed Basin Mills Development is $69.9 million in 1989 dollars. This estimated cost becomes $102.3 million when escalated to the proposed in-service date of 1999. These estimates include the cost of decommissioning the Orono Development.

b. Project Financing. The applicant expects to initially fund construction costs with unsecured short-term borrowing. At appropriate times, the construction costs will be permanently funded with a mixture of mortgage bonds, preferred stock and common stock. The amount and timing of issues of securities will depend on market conditions, tax benefits available, cash flows

and other corporate financial needs. Various third-party lease/joint venture arrangements and debt instruments will also be explored by the applicant as possible financing vehicles.

Revenues are expected to be available to cover all costs associated with the project from the sales of electricity to the applicant's customers pursuant to rates approved by the Maine Public Utilities Commission and FERC.

c. Technical Ability. The applicant has extensive experience in owning and operating hydropower facilities. Several qualified consultants, including a consulting engineering firm, have been retained by the applicant to assist in the design and construction of the project.

d. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant has the technical ability to undertake the project.

The Board further finds that the applicant is unable to demonstrate financial capability at this time. The applicant has chosen to wait to pursue financing until all required regulatory approvals have been obtained and final project design has been completed. The MWDCA specifically provides that a permit may be granted contingent upon the applicant's demonstration of financial capability prior to the commencement of project construction.

12. PUBLIC SAFETY

a. Project Impacts. The construction and operation of a major new dam could create hazards to public safety.

b. Applicant's Proposals. The applicant proposes to design, construct and operate the Basin Mills Dam in compliance with all applicable FERC dam safety standards. The applicant also proposes to install and maintain safety warning devices as required by FERC. Finally, the applicant proposes to update its current Emergency Action Plan to incorporate the operation of the new dam.

c. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant's proposals will be adequate for the protection of public safety.

13. PUBLIC ECONOMIC BENEFITS

a. Analysis. The applicant has performed a separate net benefit analysis for the Veazie Development and the Basin Mills Development. The analysis for Veazie compared the economic costs and benefits of the development, including the Plant C expansion, to the alternative of oil-fired electric generation. The analysis for Basin Mills compared the economic costs and benefits of the new dam to various alternative sources of electric generation and conservation.

The applicant has also performed modeling to determine the mix of generation and conservation that will constitute the lowest-cost alternative to the construction of the Basin Mills Dam.

The applicant has also performed an analysis of the project's impact on the income and purchasing power of Maine citizens, the energy security from reducing dependence upon fossil fuels, and the creation of employment opportunities for workers of the State.

Finally, the applicant has evaluated future load growth and capacity and energy needs within the utility's service area.

b. Consultant's Review. The DEP contracted with an independent consultant (Charles Colgan, Ph.D., Associate Professor of Public Policy and Management, Edmund S. Muskie Institute of Public Affairs) to review and comment on the applicant's net benefit analyses and the direct testimony of the applicant and intervenors on the issue of the public benefits of the Basin Mills project.

After reviewing the relevant information, Professor Colgan reached and testified to the following conclusions:

- There is a high probability that the project will result in electric customer savings of approximately $75 million in the case of the Basin Mills Development and $70 million in the case of the Veazie Development.
- The construction and operation of the project dams will create additional employment opportunities in Maine.
- There is no evidence of economic costs associated with the project dams large enough to offset the economic benefits.
- The net result is a level of benefits significantly in excess of costs that meets the tests for public benefits of the MWDCA.

c. Project Impacts. The applicant's estimates of the economic impacts of the project, based on the revised format used by the DEP's consultant (Hearing Exhibit #388), are as follows:

i. Veazie. The applicant estimates that the Veazie Development will generate primary economic benefits (customer savings and indirect benefits) of $171 million, and other economic benefits (income from construction, operation and maintenance, and property tax benefits) of $81 million, over the term of a new license.

In addition, the applicant estimates that the construction of the proposed Plant C expansion will create up to 66 direct and 57 indirect jobs a year over a 3-year construction period. The expansion is expected to create only limited employment during operation.

Finally, the applicant estimates that, with the proposed mitigation, there will not be any significant economic costs resulting from the Plant C expansion.

ii. Basin Mills. The applicant estimates that the Basin Mills Development will generate primary economic benefits of $183.3 million, and other economic benefits of $202.2 million, over the term of a new license.

In addition, the applicant estimates that the construction of the new dam will create up to 231 direct and 177 indirect jobs a year over a 4-year construction period. The new dam is expected to create only limited employment during operation.

Finally, the applicant estimates that, with the proposed mitigation, there will not be any significant economic costs resulting from the Basin Mills Dam.

d. Discussion and Findings.

i. Veazie. DEP's Chapter 450 Administrative Regulations for Hydropower Projects provide that the consideration of alternatives to the expansion of generation at an existing dam is limited to the continuation of oil-fired generation. The Board finds that the applicant has adequately performed such an analysis for the proposed Veazie expansion.

No significant questions have been raised regarding the economic benefits of the Veazie Development. The Board notes that the estimate of $70 million in primary benefits from customer savings is for the entire Veazie Development (existing Plants A and B plus proposed Plant C). However, even the proposed Plant C expansion appears to have significant economic benefits (estimated at about $17 million).

Based on the evidence in the record, the Board finds that the proposed Veazie Development will result in significant economic benefit to the public.

ii. Basin Mills. Conservation Intervenors contend that the applicant's claim of ratepayer benefits from Basin Mills is fundamentally uncertain and that its analysis of alternatives is fundamentally flawed, with the consequence that there is no assurance that the dam will produce any economic benefits. Conservation Intervenors further contend that, in the face of this uncertainty and flawed analysis, the Board should deny the project at this time, thus deferring an ultimate decision to a time closer to the dam's projected on-line date of 2005.

DEP's Chapter 450 Administrative Regulations for Hydropower Projects provide that the consideration of alternatives to the construction of a new dam must include all generation (supply-side) and conservation (demand-side) measures that might reasonably be pursued if the dam is not built. This analysis is required in order to determine whether the public will be economically better off with the dam or without the dam. This involves a comparison of a future where alternatives are displaced by the dam against a future where alternatives are pursued in lieu of the dam.

The Board is persuaded that the applicant's analysis of the economic benefits and costs of the Basin Mills Dam and its alternatives is not fundamentally flawed. The applicant is not required to compare Basin Mills against all possible energy generation or conservation alternatives, but rather against those alternatives that might reasonably be pursued if the dam

is not built. The Board finds that the applicant has adequately performed such an analysis.

The Board recognizes that the applicant must receive a certificate of public convenience and necessity from the Maine Public Utilities Commission (PUC) in order to construct and operate the Basin Mills Dam. In its review, the PUC will determine whether Bangor Hydro has a need for the power from the dam, whether the dam is the most economical (i.e., least-cost) resource available for Bangor Hydro to meet this need, and whether the timing for the construction and operation of the dam is reasonable.

In a 1990 decision dismissing Bangor Hydro's initial filing for a certificate of public convenience and necessity for the Basin Mills Project, the PUC concluded in part that its review of the project in advance of other regulatory proceedings would be premature. As the final arbitor of Bangor Hydro's overall energy plans, the PUC has essentially asked for more certainty regarding the environmental acceptability of the Basin Mills Dam before proceeding with its review of the dam. To send the project back to the PUC now would be to put Bangor Hydro on a regulatory merry-go-round which serves no legitimate public purpose.

While the PUC's decision to defer final judgment on the dam creates uncertainty in the Board's proceeding, it is by no means fatal to the Board's consideration of the project under the MWDCA. First, there is always uncertainty in making energy supply decisions, since they involve best-guess projections of the future availability and cost of generation and conservation alternatives. Thus, the Board's decision (like the PUC's) must more appropriately rely on probabilities rather than certainties.

Second, the decisions to be made by the Board and the PUC, though overlapping, are fundamentally different. The Board is not empowered to perform least-cost planning or to determine a utility's need for power. The PUC does not inquire into a project's benefits or costs beyond its effect on electric rates and service. Given the primacy of the PUC's role in the review of a public utility's energy decisions, the most appropriate role for the Board is to ask the following question: if Basin Mills is accepted by the PUC as part of a least-cost plan, will the project result in significant economic benefit to the public?

Finally, there is no statutorily mandated sequence to the respective decisions of the Board and the PUC. The Board must simply decide whether the applicant has met its burden of proof with respect to demonstrating that the Basin Mills Dam will result in significant economic benefit.

Based on the preponderance of the evidence in the record, the Board finds that there is a high probability that, if the Basin Mills Dam is accepted by the PUC as part of a least-cost plan, then the project will result in the economic benefits estimated by the applicant. However, the Board finds that the primary

economic benefits of the dam depend entirely on the electricity from Basin Mills being cheaper than the alternatives. If an equal cost or lower cost alternative exists, then Basin Mills would have no primary economic benefit, and may in fact have an economic cost. As discussed above, it is the PUC that will decide whether the Basin Mills Dam is in fact part of a least-cost plan for the utility. Therefore, the applicant must obtain PUC approval for the dam before the Board's approval becomes valid.

Apart from the costs of building and operating the Basin Mills Dam, which are included in the net benefit analysis, the only other potentially significant economic cost identified in this proceeding is the cost associated with the loss of a wild salmon run due to the Basin Mills Dam. "Existence value" is that value people attach to the mere existence of a resource or natural feature, whether or not they will ultimately ever use that resource or visit that feature. Such values are very difficult to measure, and therefore cannot easily be factored into traditional benefit-cost analyses.

The Board finds that it is likely that a wild run of salmon on the Penobscot River has an existence value. In fact, some of the money that has been spent over the last 25 years to re-establish salmon in the river can be viewed as reflecting this existence value. However, in order for the Basin Mills Dam to have no net economic benefit, the existence value of a completely wild salmon run would have to exceed the estimated economic value of the dam and the construction of the dam would have to preclude the restoration of a wild run. The Board finds that there is no convincing evidence on the record that either of these conditions will be met (see Section 17 of this order for a discussion of project impacts on the salmon run).

14. TRAFFIC MOVEMENT

a. Construction Traffic. Construction of Veazie Plant C and the Basin Mills dam and powerhouse will result in increased traffic throughout the project area. This traffic will result from the delivery of construction materials and equipment to the work sites, the excavation and disposal of soil and rock, and the daily movement of construction workers to and from work. The applicant has estimated construction traffic based on criteria used by the Maine Department of Transportation.

i. Veazie. The highest estimated average traffic total resulting from Veazie Plant C construction is 306 vehicle trips a day. Estimated construction traffic by vehicle type includes up to 134 material supply/disposal truck trips per day, 12 equipment supply truck trips per day, and 220 passager automobile trips per day. The main traffic route to the Veazie work site will be along Route 178 on the east side of the river.

ii. Basin Mills. The highest estimated average traffic total resulting from Basin Mills construction is 940 vehicle trips a day. Estimated construction traffic by vehicle type includes up to 442 material supply/disposal truck trips per day, 20 equipment supply truck trips per day, and 660 passanger

automobile trips per day. The main traffic routes to the Basin Mills work site will be along Route 178 on the east side of the river and Route 2 along the west side. In addition, there will be significant traffic generated along several local streets in Orono.

b. Proposed Mitigation. Based on comments and recommendations received from the Department of Transportation, the applicant has agreed to the following mitigation measures:

- Use of temporary traffic control measures (flaggers, signals) at identified intersections to alleviate congestion.

DOT has also recommended that the applicant implement the following additional mitigation measures:

- Development and implementation of an Advance Transportation Route Plan to distribute the timing and routing of construction traffic so as to minimize congestion.

- Development and promotion of a "Park and Ride" or mass transit system to minimize the additional traffic created by construction workers, especially during peak traffic hours in the vicinity of the Penobscot Bridge in Bangor-Brewer.

In addition, the applicant proposes to construct a temporary 1/2-mile-long access road from Island Avenue in Orono to the west end of the Basin Mills Dam site, and to install a temporary access bridge across the gated spillway section of the Basin Mills Dam. These proposals are intended to reduce construction traffic in downtown Orono and along Routes 2 and 178.

c. Discussion and Findings. Based on the evidence in the record, the Board finds that the mitigation measures proposed and agreed to by the applicant will be adequate to maintain traffic movement throughout the project area, provided that the applicant also implements the additional mitigation measures recommended by DOT.

15. MAINE LAND USE REGULATION COMMISSION

No part of the project lies within the jurisdiction of the Maine Land Use Regulation Commission. Therefore, the criterion regarding consistency with LURC zoning is not applicable.

16. FISH RESOURCES

a. Existing Resources. The Penobscot River currently supports many species of resident and migratory fish. The primary resident sport fish in the project area is the smallmouth bass. Important migratory species in the river system include anadromous Atlantic salmon, shad, alewife, blueback herring, rainbow smelt and striped bass, and catadromous eel.

Historically, the river suppported annual runs numbering in the tens of thousands of salmon and in the millions of shad and alewife. Known spawning runs of adult salmon in the river since 1968 have ranged from a low of 38 to a high of 4,529 fish, with an

average of 2,660 fish per year over the last decade. Only remnant runs of shad and alewife of unknown size currently exist.

b. Management Plans.

i. Salmon. The Atlantic Sea Run Salmon Commission (ASRSC) is currently implementing a strategic plan for the restoration of Atlantic salmon to the river. This plan includes stocking of juvenile fish, improving access to spawning habitat, and reducing fish passage delays and mortality in order to increase the size of the run.

Salmon have been stocked in the Penobscot River since the late 19th century. Annual stockings since 1965 have ranged from 7,000 to 2.1 million fish, with total stockings through 1992 of 14.7 million fish (58% smolts and 42% fry and parr).

500 to 600 returning salmon are trapped each year at the Veazie Dam and are taken as broodstock to the Craig Brook National Fish Hatchery in Orland, which is funded and operated by the U.S. Fish & Wildlife Service.

The goals of the ASRSC are: (1) to achieve an annual production of 185,000 wild smolts within the Penobscot River drainage; (2) to insure that a minimum of 6,000 adult salmon are available for spawning annually in the Penobscot River drainage; and (3) to provide a minimum of 2,000 adult salmon for sport harvest annually in the Penobscot River drainage.

ii. Shad and alewife. The Department of Marine Resources (DMR) is currently pursuing a passive plan (i.e., no stocking) for the restoration of shad and alewife to the Penobscot River. DMR's goals are to restore self-sustaining annual runs of 459,000 shad and 14.5 million alewife, of which 100,000 shad and 4-10 million alewife would be available for harvesting through regulated sport and commercial fisheries.

c. Project Impacts: Fish Passage.

i. Veazie. The construction and operation of Veazie Plant C will create a new source of attraction away from the existing fishway, will reduce existing spillage, and will draw fish through the new turbine. Without appropriate mitigation, this will result in delays in upstream passage, a decrease in upstream passage efficiency (i.e., fewer fish will successfully migrate through the dam site), and increased mortality to downstream migrating fish.

Uncontroverted evidence in the record establishes that improvements are needed to the existing fishway and trapping facilities at the Veazie Dam.

ii. Basin Mills. The construction and operation of the Basin Mills Dam will create an additional barrier in the river to upstream and downstream passage. Without appropriate mitigation, this will result in migratory delays or stoppage, a decrease in the

number of adult fish reaching suitable spawning habitat, and an increase in mortality to juvenile and post-spawner fish.

The decommissioning of the Orono powerhouse will eliminate any existing mortality to downstream migrating salmon at that location. Increased spillage at the Orono Dam due to decommissioning may attract upstream migrating fish to the base of the dam.

d. Project Impacts: Fish Habitat.

i. Veazie. According to studies conducted by the applicant, the construction and operation of Veazie Plant C will result in an increase in habitat values for juvenile salmon, shad spawners and juveniles, and all life stages of smallmouth bass in the river immediately below the dam. The amount of this increase will vary with the allocation of available flows among Plants A, B and C.

ii. Basin Mills. According to studies conducted by the applicant, the construction and operation of the Basin Mills Dam will result in the following impacts on fish habitat:

- Loss of up to 9,329 salmon nursery habitat units, representing a maximum reduction in production potential of 10,700 salmon smolts a year, due to inundation. Based on existing return rates, successful spawning and smolt production in all of the affected habitat could result in about 50 returning adult salmon per year.
- Improved habitat suitability for shad and smallmouth bass due to increased water depths.
- Improved habitat suitability for all species in the Orono bypass channel due to increased water depths and flows.

e. Proposed Mitigation. The applicant proposes various measures to mitigate project impacts on, or to otherwise enhance, fish resources, as follows:

i. Veazie.

- Maintaining operation of the existing fishway during Plant C construction.
- Making improvements to the existing fishway.
- Installing state-of-the-art upstream fish passage facilities at Plant C, to include a collection system, duplex fish lift, biological monitoring station, and sorting, holding and trucking facilities. Also proposed to be included is a public fish viewing room.
- Installing state-of-the-art downstream fish passage facilities at Plant C.
- Studying the need for an additional fishway at Plant B.

ii. Basin Mills: Initial Proposal.

- Providing unimpeded passage during the first year of construction, and installing a steeppass Denil fishway at the gated spillway section of the dam to provide passage during the remaining years of construction and during project operation.

- Installing state-of-the art upstream passage facilities, including a collection system and Denil fishway, at the new powerhouse to pass any fish not trucked from Veazie or that drop down from upstream locations.

- Installing state-of-the-art downstream fish passage facilities.

- Stocking up to 30,000 salmon smolts annually to mitigate for the loss of salmon nursery habitat.

- Funding the complete removal of the breached Bangor Dam to mitigate for the loss of salmon nursery habitat, to improve upstream fish passage, and to restore spawning habitat for rainbow smelt and shad. Specifically, the applicant has entered into an agreement with the City of Bangor, the owner of the Bangor Dam, under which the applicant has funded the removal of loose timbers and ballast from the dam (this work was undertaken during 1992) and will, contingent upon approval by the DEP of the proposed Basin Mills Dam, fund the further removal of the dam up to a total cost of $225,000.

- Trapping and trucking of up to 12,000 salmon, 30,000 shad and 150,000 alewife annually to mitigate for delays and inefficiencies in upstream fish passage at the Basin Mills, Great Works and Milford Dams (minimum trucking distance of about 8 miles).

- If required, purchasing marine fishing rights to reduce the number of salmon of Maine origin taken as part of the high seas fishery.

- If required, building and operating a hatchery to provide a supply of juvenile salmon for stocking.

iii. Basin Mills: Alternative Mitigation Proposals.

Following the Board's discussion and tabling of the Basin Mills Dam on August 25, 1993, the applicant presented several alternative mitigation proposals designed to reduce or eliminate reliance on the initial proposal to trap and truck anadromous fish from the Veazie Dam. The alternative mitigation measures proposed are as follows:

Alternative 1.

- Reducing the number of salmon to be trapped and trucked from 100% to 50% of the annual run; and

- Replacing the proposed Denil fishway at the Basin Mills powerhouse with a vertical slot fishway.

Alternative 2.

- Eliminating the proposed trapping and trucking of salmon entirely;
- Replacing the proposed Denil fishway at the Basin Mills powerhouse with a vertical slot fishway; and
- Increasing the proposed stocking of salmon smolts from a maximum of 30,000 to a maximum of 100,000 annually, and tagging these smolts so that any returning adults could be sorted at the Veazie trap and reserved for the sport harvest.

In addition to the above alternatives, the applicant proposes to study the removal of the existing Howland Dam, located in the Town of Howland at the mouth of the Piscataquis River, a major tributary to the Penobscot River, at the time of relicensing (current license expires September 30, 2000) and to remove the dam if recommended by the DEP.

f. Modeling. The U.S. Fish & Wildlife Service (USF&WS) and the applicant have each used a computer model (ASAL) to evaluate the impact of the Basin Mills Dam on the restoration of Atlantic salmon.

The ASAL model has two components. The first component (the Deterministic Model) predicts if and when a salmon run will reach its optimal population (that number of fish which saturates the available habitat). The second component (the Monte Carlo or Stochastic Model) then predicts the probability that the restoration population can maintain itself over time through natural reproduction only (i.e., be self-sustaining without supplemental hatchery stocking).

Initial Deterministic modeling (1988) by USF&WS predicted that the Penobscot River salmon run would reach a restoration population of about 12,000 fish between the years 2002 and 2005. With this result as input, the Monte Carlo model then predicted that, without Basin Mills, the probability of the run being self-sustaining was 55% by the year 2029. Assuming Basin Mills in place with state-of-the-art fish passage facilities, the model predicted that the probability of a self-sustaining run dropped from 55% to 22%.

The applicant then ran the Deterministic ASAL model using average historic marine survival rates, rather than increasing survival rates over time as assumed by USF&WS. The model predicted that the salmon run would stabilize by the year 2000 at about 5,000 fish, and that the target restoration population would never be reached.

The applicant also ran the Monte Carlo model using as input the results of the USF&WS Deterministic model (i.e., restoration population achieved by the year 2002). Factoring in the proposed

trap and truck mitigation, the model predicted that the probability of a self-sustaining run increased from 55% (the USF&WS result without the dam) to 72% with the dam and trap and truck. Running the model out to the year 2080 (reflecting the expected life of the Basin Mills Dam) yielded probabilities of the restoration population being self-sustaining of 32% without the dam and 60% with the dam and the proposed trap and truck mitigation.

More recent Monte Carlo modeling by USF&WS using revised downstream passage efficiencies has predicted an increased probability (72%) that the restoration population will be self-sustaining in the year 2029.

In response, the applicant also ran the Monte Carlo model using the USF&WS assumptions. With the dam and trap and truck mitigation in place, the model predicted that the probability of a self-sustaining restoration increased from 72% (USF&WS's prediction) to 84% in the year 2029. Running the model out to the year 2080 yielded success probabilities of 67% without the dam and 83% with the dam and trap and truck.

Finally, the applicant has also modeled the effect on restoration of substituting one of the alternative mitigation proposals discussed above for the initial mitigation proposal. The model predicted that the probability of achieving and maintaining a self-sustaining salmon restoration decreased in the year 2080 from 83% (initial mitigation proposal) to 73-74% (for either alternative mitigation proposal). However, this is still greater than the 67% probability of success predicted in the year 2080 without the Basin Mills Dam.

g. Discussion and Findings.

i. Veazie. Several intervenors and other agency and public commenters contend that the applicant should provide a new fishway at Veazie Plant B immediately, along with installing a fish lift at Plant C and improving the existing Plant A fishway as proposed.

A USF&WS fishway design engineer testified that to obtain maximum fish passage efficiency at Veazie, a fishway would be required at Plant B, even with installation of the proposed Plant C fish lift. The engineer also testified that he will not recommend a Plant B fishway unless there is a demonstrated need for the facility, and that this need should be studied once all other proposed fish passage improvements have been made at the dam. Finally, the engineer testified that a Plant B fishway would cost an estimated $3-5 million.

Based on the preponderance of evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate for the impacts of the Veazie Development on fish passage. The Board is persuaded that there is not at this time a demonstrated need for a fishway at Plant B, and that a future study of this need is appropriate and reasonable, especially in light of the cost of such a facility.

Several commenters argue that the question of fishway cost is irrevelant. These commenters argue that, because Veazie is the first upstream barrier in the river and is the source of all salmon hatchery brood stock, the fish passage provided here should be the best that money can buy.

The Board finds this argument unpersuasive. The Board understands the special importance of having good fish passage at Veazie to help ensure the future viability of the salmon run. The Board further understands the importance of having major improvements made in existing fish passage, trapping and handling facilities at the dam. However, the Board finds that the evidence in the record does not support the imposition of a requirement to build a fishway at Plant B at this time.

The Board recognizes that there may be disagreements between the applicant and fisheries agencies regarding whether the studies conducted indicate that a Plant B fishway is in fact needed. Therefore, the applicant must submit the results of its Veazie fish passage study to the Department for review and appropriate action.

Based on the evidence in the record, the Board also finds that the applicant's proposals will be adequate to mitigate for project impacts on fish habitat below the Veazie Dam.

ii. Basin Mills.

Stocking. Conservation Intervenors and other commenters argue that the Basin Mills Dam will cause a significant loss of salmon habitat in the river, and that the stocking of hatchery-reared fish is an inappropriate and inadequate mitigation for this loss.

With respect to habitat loss, the Board finds that the affected habitat represents only a small percentage of the available salmon spawning and nursery habitat in the Penobscot River system. The Board further finds that the affected habitat is not of high value, and that full and successful utilization of this habitat is not occurring now and is unlikely to occur in the future. Finally, the Board finds that the applicant's stocking proposal will more than compensate for any loss of natural salmon reproduction in the area affected by the Basin Mills Dam.

With respect to stocking, the Board finds that the stocking of hatchery-reared salmon is an often-used mitigation measure for the impacts of hydro dams that is both technically feasible and biologically viable. The Board also finds that virtually the entire run of salmon in the Penobscot River today is the result of stocking by state and federal agencies. Finally, the Board finds that stocking of high quality, disease-free salmon from private hatcheries is currently taking place on other rivers in Maine, and that there is no convincing evidence that this stocking is having any greater or lesser genetic impacts than stocking from federal hatcheries.

Based on these findings, the Board is persuaded that the proposed stocking is an appropriate mitigation measure for the loss of salmon habitat due to construction of the Basin Mills Dam.

Bangor Dam Removal. Conservation Intervenors, several fisheries agencies, and various public commenters argue that the applicant's proposed removal of the Bangor Dam should not be considered as mitigation by this Board since (1) dam removal will not restore any significant amount of salmon habitat and (2) the dam is already breached and its removal by natural or regulatory forces is only a matter of time.

The applicant has conceded and the Board finds that the removal of the Bangor Dam is unlikely to result in any significant increase in available salmon spawning and nursery habitat in the existing impoundment area.

However, the Board finds that the removal of the dam will improve fish passage and will increase available spawning habitat for rainbow smelt and shad. The City of Bangor, as owner of the dam, currently is not under any regulatory obligation to remove the dam, and complete dam removal will require considerable time and expense. Also, the Board takes notice that both the ASRSC and DMR, have commented to the City regarding the fish passage benefits of removing the dam. Therefore, the Board is persuaded that the applicant's removal of the Bangor Dam is a credible measure to mitigate the impacts on the Basin Mills Dam on fish habitat and fish passage.

The Board finds, however, that the applicant has only presented a limited financial agreement with respect to the removal of the Bangor Dam.

Trap and Truck. Conservation Intervenors, the Penobscot Indian Nation, state and federal fisheries agencies, and numerous public commenters contend that the Basin Mills Dam will endanger Penobscot River fish restoration programs, and that the proposed trap and truck mitigation is unacceptable because (1) it will bypass the river between the Veazie and Milford Dams, (2) it will make all anadromous fish runs totally dependent on human intervention, (3) it may result in fish mortality, (4) it may pose genetic risks, and (5) it will threaten the future existence of a wild salmon run.

The Board finds that trapping and trucking the entire runs of salmon and shad from Veazie, as proposed, will essentially eliminate all fishing for these species in the river between the Veazie and Milford dams. Fishing opportunity cannot exist if there are no fish present. This negative impact can be avoided by allowing some of the runs to swim upstream from Veazie, thus making fish available for angling.

The Board finds that today's Penobscot River salmon run is currently completely dependent on human intervention. Salmon brood stock are trapped and trucked from the Veazie Dam to a federal fish hatchery, where eggs are harvested, artificially fertilized, and then raised in an artificial environment.

Juvenile fish are then trucked and stocked back in the river, to migrate to the ocean through man-made dams. Upon their return to the river as adults, these fish must migrate upstream through concrete fishways. The Board is not persuaded that the proposed trapping and trucking is any less natural, or any more invasive, than current management techniques.

The Board finds that trapping and trucking is a viable management technique that has been used on the Penobscot and other rivers in Maine and other states to aid in the restoration of anadromous fish. The Board finds no convincing evidence in the record that a state-of-the-art trapping and trucking operation will pose any significant genetic risks or lead to significant fish mortality.

The Board finds that the applicant's proposal for trapping and trucking of shad and alewife will increase the numbers of these fish in the river in the short-term and will improve the chances of successful restoration of these species in the long-term. This is especially true in view of DMR's current passive restoration effort and lack of financial resources.

The Board is persuaded by the evidence in the record that, by decreasing delays and inefficiencies in upstream fish passage, the applicant's trap and truck proposal will result in more salmon reaching prime spawning areas, which will in turn lead to more natural reproduction in the river, which will lead--all other things being equal--to larger returns of adult salmon. The ASAL model shows an increase in the probability of successful restoration when comparing the future with the Basin Mills Dam and trap and truck against the future without the dam. In view of the current state of the salmon restoration effort, it seems prudent to take all available measures to increase the size of the salmon run.

The Board is also persuaded by the evidence in the record that the fisheries agencies can successfully truck the proposed numbers of salmon, shad and alewife. Evidence has been presented that equal or larger numbers of fish have been successfully trapped and trucked for greaterdistances elsewhere (for example, at the Mactaquac Dam in New Brunswick and the Conowingo Dam in Maryland). No convincing evidence has been presented that such a program cannot work on the Penobscot River.

The Board finds that it has been established without challenge on the record that there is no guarantee that the on-going effort to restore salmon to the Penobscot River will be successful. Further, the Board is persuaded by the evidence that restoration of a completely self-sustaining salmon run is highly unlikely with or without the Basin Mills Dam. This means that some stocking will likely always take place to supplement natural spawning and that the run will likely never be completely wild.

Finally, the Board finds that one of the most significant impediments to successful fish restoration on the Penobscot

River is the lack of adequate staff and financial resources in the State's Atlantic salmon agency.

Other Dam Removal. Conservation Intervenors and other commenters contend that, rather than undertaking a trapping and trucking program, the applicant should be required to remove another dam on the lower Penobscot River to provide acceptable in-kind mitigation for the habitat and fish passage impacts of the Basin Mills Dam.

No studies have been submitted into evidence on the economic, environmental or social impacts of removing any existing main stem river dam. Faced with this lack of information, the Board has no evidence on which to judge the benefits of the removal of any dam.

One dam specifically mentioned as a possible candidate for removal, the Great Works Dam, is owned by a corporate entity other than the applicant, and is licensed by FERC as a hydro project. The applicant has no means to gain control of or to remove the dam without the current owner's consent, and the Board has no authority to order the removal of the dam as mitigation for Basin Mills.

The applicant has proposed as an alternative mitigation measure to evaluate the costs and benefits of removing the Howland Dam. Based on the available evidence, the Board finds that removal of the Howland Dam would provide an unknown amount of in-kind mitigation for the loss of salmon habitat due to the construction of the Basin Mills Dam, and may result in an increase in available salmon spawning and nursery habitat. The Board also finds that removal of the dam would improve fish passage into and out of the Piscataquis River, which contains 38 percent of the salmon smolt production habitat currently available in the Penobscot River Basin. The Board recognizes that, if the economic, environmental and social costs are acceptable, removal of the Howland Dam would benefit the salmon restoration effort. However, a final determination on whether the Howland Dam should in fact be removed cannot be made until the necessary studies have been undertaken and the overall costs and benefits analyzed.

Ultimately, the question for the Board to ask in this proceeding is this: does the Basin Mills Dam, as proposed and reasonably conditioned, meet the test of the applicable laws for approval? If it does, it must be approved. If it does not, it must be denied. Specifically, the project must be denied if, in the judgment of the Board, the impacts on fish habitat and fish passage are not adequately mitigated by the applicant's proposals and/or by reasonable and lawful conditions imposed by the Board.

Fish Passage. Based on the evidence in the record, including the comments of the fisheries agencies and several intervenors, the Board finds that replacing the applicant's proposed Denil fishways at the Basin Mills powerhouse and spillway with either vertical slot fishways or fishlifts will improve the fish passage available at the new dam.

Native Fishing Rights. The Penobscot Indian Nation argues that tribal members have a right to harvestable numbers of anadromous fish in the Penobscot River, and that construction of the Basin Mills Dam will interfere with this right by threatening the on-going efforts at restoration and by trucking fish around the tribal reservation.

The Board finds that the fishing rights of members of the Penobscot Nation are spelled out in An Act to Implement the Maine Indian Claims Settlement, 30 MRSA § 6201 et seq. This statute provides in part that "notwithstanding any rule or regulation promulgated by the [Maine Indian Tribal-State] Commission or any other law of the State, the members of the Passamaquoddy Tribe and the Penobscot Indian Nation may take fish, within the boundaries of their respective Indian reservations, for their individual sustenance..."30 MRSA § 6207.4).

The Board finds that the Basin Mills Dam will not interfere with the sustenance fishing rights of tribal members. However, as discussed above, the Board finds that trucking all of the runs of salmon and shad will essentially eliminate all fishing for these species in the river between the Veazie and Milford dams, and may affect fishing opportunity at the Indian Island reservation. This negative impact can be avoided by allowing some of the runs to swim upstream from Veazie, thus making fish available for angling.

Conclusion. Based on the foregoing facts and the preponderance of the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate the impacts of the Basin Mills Dam on fish habitat and fish passage, provided that the additional measures discussed below are taken.

The applicant must prepare and implement a detailed plan to remove the Bangor Dam, including a description of and schedule for demolition activities and spoils disposal plans. The applicant must also prepare a plan to preserve the site from future development after the dam is removed.

The applicant must, in consultation with appropriate agencies, prepare and implement a plan to provide all necessary funds or other resources for the Atlantic Sea Run Salmon Commission and the Department of Marine Resources to trap and truck anadromous fish from the Veazie Dam. The ASRSC and DMR shall continue to be responsible for the management of all anadromous fish restoration activities on the river.

Any trap and truck program may have problems that will impair its overall effectiveness. Such problems include fish stress and mortality due to handling and trucking, fallback and unsuccessful passage of trucked fish, and mechanical and other operational problems. Therefore, the applicant must conduct a study to evaluate the effectiveness of the approved trap and truck program.

As noted under project impacts, increased spill due to the decommissioning of the Orono powerhouse may attract fish to the base of the Orono Dam. Therefore, the applicant must conduct a study to determine the need for upstream fish passage at the Orono Dam and must be prepared to provide such passage facilities as are needed to address delays in migration or dead-ending due to spill at the dam.

The applicant must, in consultation with appropriate agencies, prepare and implement a detailed plan to annually stock at least 30,000 high quality, disease-free salmon smolts, or biologically equivalent numbers of salmon fry or parr, for the full license term of the project.

The applicant must install either a vertical slot fishway or a fishlift at both the Basin Mills powerhouse and spillway.

The applicant must, in consultation with the Town of Howland and appropriate agencies, undertake and present to the Board the results of studies evaluating the economic, environmental and social costs and benefits of removing the Howland Dam. If the Board finds, based on a review of these studies, that removal of the Howland Dam is in the public interest and satisfies the criteria of the MWDCA and applicable water quality standards, then the applicant shall propose and pursue the removal of the dam through FERC and other appropriate regulatory agencies.

Finally, the applicant must establish a trust fund to be administered by the Atlantic Sea Run Salmon Commission for the full license term of the project for salmon management activities on the Penobscot River as mitigation for the Basin Mills Dam. Such activities may include, but need not be limited to, fish monitoring, genetic sampling and evaluation, habitat improvement or protection, and other enhancement or mitigation activities intended to improve the quality and quantity of the Penobscot River salmon run. The applicant's contributions to the trust fund must start at a level of $100,000 and must increase or decrease each succeeding year by the inflation rate for the previous year. This will provide a minimum of $5 million plus inflation over the term of the project license. The trust fund will be administered by the ASRSC based on that agency's best professional judgment.

17. RECREATIONAL ACCESS AND USE

a. Existing Conditions. Current recreational uses in the project area include fishing, hiking, canoeing, swimming, boating, and various passive recreational activities.

Small boat access to the river below the Veazie Dam is available at the Veazie and Eddington Salmon Clubs and at a public boat launch in Brewer. There are no public boat access facilities on the river between the Veazie Dam and the Great Works Dam. There are several formal and informal boat access sites along the Stillwater River in the Orono Dam impoundment area.

b. Mitigation Proposals. The applicant proposes to construct a number of recreational facilities to provide for public access to and use of the project area. These facilities include (starting below the Veazie Dam and proceeding upstream):

i. Veazie.

- A day use park and fishing access facility located adjacent to the proposed Veazie Plant C in Eddington. The park will include car and bus parking areas, restrooms, a picnic area, a scenic overlook, and walking trails with interpretive signs on the topics of anadromous fish migrations, plant identifications, archaeological discoveries, and hydropower development. Access will also be provided through the park to the fish viewing room proposed at Plant C. The fishing access facility will include parking and an access walkway to the Eddington Pool area.

- A day use park, including parking and picnic areas, trails, and a canoe launch site, located off River Street in Veazie (immediately upstream from the existing Veazie powerhouses).

- A trailered boat launch and parking facility located off Route 178 in Eddington.

- A trailered boat launch and picnic area located off Union Street in Orono (adjacent to the southern end of Ayers Island).

The applicant also proposes to preserve a contiguous 7,000-foot-long section of river shoreline below the Veazie Dam in Veazie to ensure future public access to the area for shore angling. The shoreline to be preserved includes a 1,200-foot-long section recently purchased by the applicant and a 5,800-foot-long section which is part of the parcel containing the applicant's Graham Station generating facility.

ii. Basin Mills.

- A waterfront park, including a parking area, a playground, an informational and interpretive kiosk, walking paths, and scenic overlooks, located off Broadway and Water Streets in Orono (adjacent to the area currently occupied by the Orono Development penstocks and powerhouse).

- Two canoe portage trails, one from the Orono Dam around the west end of the Basin Mills Dam, the other in Bradley around the east end of the Basin Mills Dam.

- A trailered boat launch and day use park, including parking and picnic areas and accommodations for a municipally-operated outdoor ice skating rink, located off Route 178 in Bradley.

- A canoe and carry-in boat launch facility, including a parking area, located at the site of the existing Orono-Veazie Water District building on Penobscot Street in Orono.

- A carry-in boat launch and fishing access facility, including an access road and parking area, located adjacent to the decommissioned powerhouse at the West Enfield Project in Enfield.

The applicant proposes to monitor the adequacy of all proposed access facilities for a period of three years following construction.

In addition, the applicant proposes to maintain the existing Orono Dam to maintain the impoundment for general recreational use.

c. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate project impacts on, and to otherwise enhance public recreational access to and use of, the project area, provided that the additional measures discussed below are taken. In particular, the Boards finds that the applicant's proposals will greatly improve public recreational access to, and resulting use of, the river between the Veazie Dam and the upstream Great Works Dam.

The applicant must prepare a plan to periodically evaluate the adequacy of recreational access to the project area for the full term of the project license, and must be prepared to provide additional recreational facilities as required by the Department to meet an identified access need.

The applicant must prepare and implement a plan to preserve the shoreline on the west side of the river below the Veazie Dam for shore angling. The applicant must also prepare a plan and implement for providing facilities for public access to the area. Such facilities may include access roads, parking areas, and access walkways, as appropriate.

Finally, the applicant must prepare and implement a plan to construct a canoe portage trail, including take-out and put-in sites, around the Veazie Dam.

18. FISHING OPPORTUNITY

a. Existing Conditions.

i. Veazie. The Penobscot River below the Veazie Dam is the most heavily fished area for Atlantic salmon in the United States. Fishing occurs primarily in the area immediately upstream and downstream from the breach in the Bangor Waterworks Dam and in the area from the Veazie Dam downstream to the water district pipeline crossing. Fishing occurs from boats and from shore. Some fishing for striped bass and smallmouth bass also occurs below the Veazie Dam.

There is limited fishing for resident game fish, primarily smallmouth bass, in the Veazie impoundment.

ii. Basin Mills. There is limited fishing for Atlantic salmon and resident game fish in the area that would be impounded by the proposed Basin Mills Dam.

b. Project Impacts.

i. Veazie. According to studies conducted by the applicant, the construction and operation of Veazie Plant C will result in the following impacts on salmon fishing opportunity:

- Loss of one shore fishing site (1 rod of angling opportunity) in Eddington due to the downstream encroachment of the new powerhouse and the resultant relocation of the State-imposed 150 foot no-fishing zone.
- Loss of two shore fishing sites (2 rods of angling opportunity) in Veazie due to reduced operation of Plant B turbines under low flow conditions.
- Loss of an undetermined number of boat and shore fishing sites due to the effect of discharges from Plant C on existing flow conditions below Veazie.

The construction and operation of Veazie Plant C will also result in the creation of an undetermined amount of additional angling opportunity for shad and striped bass due to the change in water depths and flows in the tailrace area.

ii. Basin Mills. According to studies conducted by the applicant, the construction and operation of the Basin Mills Development will result in the following impacts on salmon fishing opportunity:

- Loss of up to 38 potential lies, representing 66 rods of boat angling opportunity and 5 rods of shore angling opportunity, due to increased water levels.
- Creation of an undetermined number of potential lies due to increased water levels and flow in the Orono bypass channel.

The construction and operation of the Basin Mills Development will also result in the creation of an undetermined amount of additional shad and smallmouth bass angling opportunity due to changes in water depths and velocities.

c. Proposed Mitigation. The applicant proposes various measures to mitigate potential negative project impacts on fishing opportunity, as follows:

i. Veazie.

- Positioning the Plant C tailrace to direct the discharge from the turbine into the main river channel.
- Creating artificial salmon lies in the Plant C tailrace.
- Varying the operating sequence of the Plant A, B and C units, if requested by the regulatory agencies, to maximize angling opportunity below the dam.

- Providing for public access as described in Section 18 of this order.

ii. Basin Mills.

- Funding the complete removal of the breached Bangor Waterworks Dam, as described in Section 17 of this order.
- Creating artificial salmon lies in the Basin Mills tailrace and in the river below the water district pipeline following the removal of the Bangor Dam.
- Providing for public access as described in Section 18 of this order.

d. Discussion and Findings.

i. General. Fishing opportunity is primarily a function of three factors: (1) the presence of fish; (2) the existence of physical conditions (water depths, flows, temperature, cover, etc.) favorable for the catching of fish; and (3) the existence of access to suitable fishing sites.

Where successful Atlantic salmon angling occurs, a salmon "lie" is said to exist. A lie is a localized habitat with certain characteristics of water depth and velocity, substrate and cover which, in combination, result in an upstream migrating adult salmon being both present (in a holding or resting pool) and willing to take a fly (a dressed, unweighted hook). Lies occur over a range of physical conditions.

ii. Veazie.

Angling Opportunity. Conservation Intervenors and numerous public commenters contend that the proposed Veazie expansion will endanger or destroy significant salmon angling opportunity below the Veazie Dam.

The Board finds that the applicant has presented convincing evidence that the proposed Plant C expansion, with appropriate mitigation, will not materially affect overall angling opportunity in this area. Successful salmon angling presently occurs below the Veazie Dam under a wide range of water flow, depth, and velocity conditions. This will continue to be the case with Plant C in operation.

However, the Board finds that the applicant has only partially simulated, and has not fully modeled, the effect of Plant C operation on existing flow conditions below the dam. The applicant has stated that it plans to determine the exact angle of the powerhouse and tailrace through a hydraulic modeling study to be conducted prior to final project design.

Salmon Lies. Conservation Intervenors and several public commenters contend that salmon lies cannot easily be created, and that the applicant's proposals to mitigate for the loss of lies are unproven or unworkable.

The Board finds that the creation of artificial salmon lies is both feasible and practical. This method has been approved elsewhere by the Department as adequate mitigation for hydro project impacts. While the creation of lies is not an exact science, the Board is persuaded by the evidence in the record that such mitigation is appropriate and workable here. However, the Board finds that the applicant has not specified how and where the proposed lies will be constructed.

Special Protection. Conservation Intervenors also contend that the river below the Veazie Dam is a specially protected river segment under the 1983 Maine Rivers Policy, and that, as a result, the Board is statutorily prohibited from approving any expansion of the Veazie Dam that would diminish the significant values of this river segment for salmon fishing.

The Maine Rivers Policy provides that no MWDCA permit or water quality certification can be issued for the additional development or redevelopment of existing dams on river segments subject to special protection where the development or redevelopment would diminish the significant resource values of the segment. 12 MRSA § 403. Among the river segments protected under the policy is the Penobscot River "from Stockton Springs up to, but not including, the Veazie Dam." 12 MRSA § 403(12). The DEP has interpreted this language to mean that any expansion of generating capacity at the Veazie Dam would not be subject to the "no diminishment" test since the dam is located above--not on--the identified protected river segment. The Board concurs with this interpretation.

Public Access. Finally, the Board finds that the current lack of public access appears to be the single most significant factor limiting overall fishing opportunity in the Veazie impoundment. This situation will be remedied by the applicant's public access proposals.

Conclusion. Based on the preponderance of the evidence in the record, the Board finds that the applicant's proposals will adequately mitigate for the negative impacts of the construction and operation of Veazie Plant C on fishing opportunity, provided that the additional measures discussed below are taken.

The applicant must conduct a hydraulic modeling study and must design the Plant C tailrace to minimize the effect of Plant C discharges on existing angling opportunity (specifically, the effect on water depths and velocities at existing angling sites).

The applicant must consult with the Atantic Sea Run Salmon Commission and must prepare an operating plan for the Veazie Development that will maximize angling opportunity below the dam without unacceptably impairing fish passage.

Finally, the applicant must prepare and submit a plan detailing the construction of lies in the Plant C tailrace. The applicant must also monitor and report on the effectiveness and permanence of the lies constructed, and must be prepared to

take any additional actions necessary to fully mitigate for project impacts on existing angling opportunity.

iii. Basin Mills.

Angling Opportunity. Conservation Intervenors and other public commenters contend that construction of the Basin Mills Dam will impound and destroy most of the salmon fishing opportunity in a currently free-flowing stretch of river, and that the applicant's proposal to mitigate for this loss by creating salmon lies is inadequate.

The Board finds that there is little salmon angling presently occurring in the area that would be affected by the proposed Basin Mills Dam. While public access to this area is currently very limited, it is likely that fishing would have become established here if salmon, which are present, were being caught. Thus, while a number of potential lies have been identified based on physical and subjective evaluations by experts, there is no convincing evidence in the record that there will be any significant amount of successful salmon angling between the Veazie Dam and the Great Works Dam with or without construction of the Basin Mills Dam. Therefore, the effect of the dam on salmon angling will likely be minimal.

As discussed under Veazie above, the Board finds that the creation of artificial salmon lies is both feasible and practical, and has been approved elsewhere by the Department as adequate mitigation for hydro project impacts. While the creation of lies is not an exact science, the Board is persuaded by the evidence in the record that such mitigation is appropriate and workable here. However, the Board finds that the applicant has not specified how and where the proposed lies would be constructed.

Bangor Dam Removal. Conservation Intervenors and several fisheries agencies argue that the applicant's proposed removal of the Bangor Dam should not be considered as mitigation by this Board since the dam is already breached and its removal by natural or regulatory forces is only a matter of time.

The Board finds that the removal of the Bangor Dam is likely to create additional angling opportunities at natural lies in the existing impoundment area, especially under low tide conditions. As discussed earlier, the City of Bangor, as owner of the dam, currently is not under any regulatory obligation to remove the dam, and complete removal of the dam will require considerable time and expense. The Board also takes notice that both the ASRSC and DMR, have commented to the City regarding the angling benefits of removing the dam. Therefore, the Board is persuaded that the applicant's removal of the dam is a credible measure to mitigate the impacts of the Basin Mills Dam on fishing opportunity.

However, the Board finds that the applicant has only presented a limited financial agreement with respect to the removal of the Bangor Dam. The Board also finds that the exact number of

natural lies that would be created cannot be determined until the Bangor Dam is actually removed.

Public Access. Finally, the Board finds that construction of the Basin Mills Dam and the applicant's public access proposals will benefit fishing opportunity for resident game fish and shad in the river between the Basin Mills site and the Great Works Dam.

Conclusion. Based on the preponderance of the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate for the impacts of the Basin Mills Development on fishing opportunity, provided that the additional measures discussed below are taken.

The applicant must prepare and submit a plan detailing the construction of lies in the Basin Mills tailrace. The applicant must also monitor and report on the effectiveness and permanence of the lies constructed, and must be prepared to take any additional actions deemed necessary by the Department to fully mitigate for project impacts on existing angling opportunity.

The applicant must prepare and implement a detailed plan to remove the Bangor Dam, including a schedule for and description of demolition activities and spoils disposal plans. The applicant must also prepare a plan to preserve the site from future development once the dam is removed.

Finally, the applicant must monitor and submit a report on the salmon angling opportunity created by the removal of the Bangor Dam, and must be prepared to create additional artificial lies or undertake additional riverine modifications as required to fully restore and enhance salmon angling opportunity in the Bangor Dam impoundment area.

19. WILDLIFE

a. Existing Resources. The project area supports a variety of wildlife common to the central Maine region. No threatened or endangered species are known to inhabit the area. Endangered bald eagles are common visitors, however, and feed in the area, particularly during the winter.

b. Habitat Study. The applicant has examined the wildlife impacts of the proposed Basin Mills Development using the U.S. Fish & Wildlife Service Habitat Evaluation Procedure (HEP) methodology.

The HEP study area encompassed a total of 526 acres of water surface and upland and riparian habitat within the 500-year flood plain from Ayers Island to the Great Works Project tailrace. Existing land cover types that were identified and mapped in this area include agricultural-open land (15 acres), shrub-swamp land (5 acres), bottomland forest (109 acres), hardwood forest (50 acres), mixed forest (26 acres), shrubland (35 acres), and shallow marsh (36 acres).

Evaluation species were chosen in consultation with IF&W and USF&WS as being (1) representative of all wildlife species using the available habitat and (2) sensitive to habitat changes due to project construction and operation. Evaluation species chosen included eastern meadowlark, wood duck, grey squirrel, beaver, mink, and muskrat.

Expected changes in habitat suitability for the evaluation species were predicted for two futures, one with and one without the Basin Mills Dam, for a 103-year period (3 year construction period plus two 50-year license terms). Habitat suitability is a measure of the carrying capacity of the study area for a given wildlife species.

Project impacts include temporary habitat disturbance during construction and permanent habitat loss due to inundation, placement of rip-rap, and installation of project facilities.

c. Study Results. The applicant's HEP study predicted that, based on the initial project proposal, overall habitat suitability for the evaluation species will increase by an average of almost 18 habitat units per year over the study period with the Basin Mills Dam in place as compared to the habitat that would exist without the dam. This increase in habitat suitability would be the result of the creation of additional shallow marsh along the margins of the new impoundment. However, the initial project proposal involved the permanent loss of 33 acres and the temporary disturbance of 64 acres of habitat.

The applicant has subsequently revised its proposal to avoid temporary construction impacts and permanent loss of several wetlands with value for wildlife. Under the revised proposal, a total of 15 acres of habitat are expected to be permanently lost, while another 46 acres will be temporarily disturbed during construction.

Under the revised project proposal, the applicant predicts that overall habitat suitability for the evaluation species will increase by an average of almost 56 habitat units per year with the Basin Mills Dam in place as compared to without the dam. Individually, habitat suitability will increase for all evaluation species expect grey squirrel, which will be adversely affected by the loss of bottomland forest habitat. Over 90% of the available habitat units will be for beaver and mink and other species with similar habitat requirements.

d. Mitigation Proposals. In view of the anticipated increase in wildlife habitat values due to the construction of the dam, the applicant proposes no specific measures to mitigate for the permanent loss of wildlife habitat.

However, the applicant has provided a one-time grant of $70,000 to allow the Orono Land Trust to purchase and protect a 56-acre parcel of land (known as the Piney Knoll parcel) adjacent to the new Basin Mills impoundment in Orono from future development. This action should preserve the wildlife values of the parcel.

e. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate for project impacts on, and to otherwise enhance wildlife habitat in, the project area.

20. WETLANDS

a. Existing Conditions. The applicant has delineated the existing wetlands within the 500-year flood plain from Ayers Island to the Great Works Project tailrace. This work was done in accordance with the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands.

Forty-one separate wetlands totalling 83 acres were identified within the study area. Of this total, 66.4 acres were identified as a protected natural resource under DEP jurisdiction (wetlands of 10 or more acres in size or located within the floodplain of a river, stream or brook). All but 0.4 acres of the jurisdictional wetlands were determined to be Class II wetlands as defined by DEP's Chapter 310 Wetland Protection Rules; the remaining 0.4 acres were determined to be Class III wetlands. No Class I wetlands were identified in the study area.

No rare or endangered plants have been found in the project area.

b. Wetland Functions and Values. The applicant has identified the functions and values provided by the 66.4 acres of jurisdictional wetlands using the Corps of Engineers' Wetland Evaluation Technique (WET 2).

According to the applicant's evaluation, the functions likely to be served by these wetlands include floodflow alteration, sediment retention, nutrient removal, and wildlife diversity. Other wetland functions are unlikely to occur.

c. Project Impacts. Under the initial project proposal, 16.6 acres of wetlands would have been permanently lost due to filling, excavation or inundation associated with the Basin Mills Development.

The applicant has subsequently revised the project proposal to avoid impacts on 4.9 acres of wetlands, reducing the area of wetlands that will be permanently lost to 11.7 acres. Impacts on these wetlands include 2.2 acres filled, 6.0 acres excavated, and 3.5 acres inundated.

The affected wetlands include 8.3 acres of forested wetland, 1.8 acres of scrub-shrub wetland, 1.1 acres of unconsolidated shore wetland, and 0.5 acres of emergent wetland. The applicant has found no practicable alternatives that would avoid the permanent loss of these wetlands.

In addition, another 1.1 acres of forested and unconsolidated shore wetlands will be temporarily disturbed during project construction.

d. Mitigation Proposals. The applicant proposes the following measures to mitigate impacts on wetlands:

- Restoring the 1.1 acres of wetlands temporarily disturbed during project construction.
- Restoring a total of 14.9 acres of wetlands.
- Enhancing a total of 10.6 acres of wetlands.
- Preserving a total of 25.6 acres of wetlands.
- Creating 3.9 acres of wetlands.

Permanent mitigation is proposed for a total of 54.5 acres of wetlands located at five separate sites within the project area. These sites are described as follows:

(1) A 12.9-acre site located immediately upstream of the proposed powerhouse. Proposed restoration, enhancement and creation efforts here are expected to result in a mosaic of shrub wetland, emergent wetland, and open water that will provide various functions including sediment and toxicant retention, nutrient transformation, recreation, and waterfowl habitat.

(2) A 16-acre site located on the west shore of the new impoundment. Proposed restoration and enhancement here is expected to provide wetlands types and functions similar to that at the first site.

(3) A 15.3-acre site located on the west bank of the river adjacent to Ayers Island. This complex of bottomland forest, shrub wetland, emergent wetland, and open water is proposed to be preserved to maintain its function and value for waterfowl habitat.

(4) A 5.3-acre site located immediately south of the new powerhouse. This complex of forested wetland and shrub wetland is proposed to be preserved to maintain its function and value for flood storage, sediment retention, nutrient removal, and wildlife diversity.

(5) A 5.0-acre forested wetland located within the Piney Knoll parcel. This wetland will be preserved to maintain its function and value for flood storage and wildlife diversity.

The proposed mitigation is intended to compensate for lost wetland functions at an overall ratio of 4.65 to 1 of mitigation acres to impacted acres.

e. Discussion and Findings. Based on the preponderance of the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate for project impacts on wetland functions and values within the project area, provided that the additional measure discussed below is taken.

The applicant has not yet prepared detailed plans for the proposed restoration, enhancement, preservation, and creation of wetlands. Therefore, the applicant must prepare and implement a plan detailing wetland mitigation efforts within the project area. This plan shall include provisions to monitor and report on the success of all wetland mitigation efforts. The applicant must also be prepared to take any additional actions deemed necessary by the Department to fully compensate for lost wetland functions and values.

21. AQUATIC LIFE (OTHER THAN FISH)

a. Existing Conditions. The applicant has sampled the community of aquatic species other than fish (i.e., benthic macroinvertebrates) in the project area. The results of this sampling are as follows:

i. Veazie. The diversity and abundance of macroinvertebrates present in the Veazie impoundment is typical of an impounded section of a lower main stem river that is substantially influenced by human activity.

ii. Basin Mills. The diversity and abundance of macroinvertebrates present between the Veazie impoundment and the Great Works Dam is typical of a free-flowing section of a lower main stem river that is influenced by human activity.

b. Project Impacts.

i. Veazie. No change is anticipated in the existing aquatic community above or below the Veazie Dam due to the construction of the Plant C powerhouse.

ii. Basin Mills. Construction of the Basin Mills Dam will result in increased water depths, decreased current velocity, increased water residence time, and decreased dissolved oxygen levels in the river between Ayers Island and the Great Works Project tailrace. These changes in hydraulic and chemical conditions will result in changes in the diversity, abundance and species composition of the existing flowing water macroinvertebrate community. However, the Basin Mills impoundment will have similar physical characteristics (surface area, volume, depth, length, and flushing rate) to the existing Veazie impoundment. Therefore, the Basin Mills impoundment is expected to have an aquatic community very similar to that in the Veazie impoundment.

c. Discussion and Findings. The Maine Legislature has specifically recognized that the creation of impoundments on naturally free-flowing rivers changes the nature of the habitat and aquatic life in the affected waters. The Legislature has declared that the aquatic life in existing Class B impoundments need only meet the aquatic life criteria of Class C waters. The Legislature has also declared that the construction of a new hydropower project may cause some change to the habitat and aquatic life of the affected waters so long as the criteria of the assigned classification are met (see Section 10 of this order for a summary of applicable water quality standards).

Conservation Intervenors argue that the Basin Mills Dam will cause the loss of at least one aquatic species (stoneflies) and an increased dominance of several other species (midges and caddisflies), and that these effects constitute "detrimental changes in the resident biological community", in violation of applicable Class B water quality standards.

Based on the evidence in the record and the professional judgment of the DEP staff, the Board finds that the aquatic community in the new Basin Mills impoundment will be similar to that in the existing Veazie impoundment, which is in turn similar to that found in the several other impoundments on the lower Penobscot and Stillwater Rivers. Within the last year, the Department has issued water quality certifications for the Stillwater Project (located on the Stillwater River upstream from the Orono Dam) and the Milford Project (located on the Penobscot river upstream from the Great Works Project). In issuing these certifications, the Department found the existing aquatic community in the project impoundments to be meeting Class B criteria. The Board finds that, while construction of the Basin Mills Dam will result in changes in the existing aquatic community in the impoundment area, these changes are not expected to prevent attainment of Class B standards for aquatic life.

Based on the preponderance of the evidence in the record, the Board finds that the Basin Mills Project as proposed will satisfy applicable water quality criteria for aquatic life other than fish.

22. GROUNDWATER

a. Project Impacts. The proposed construction of the new Basin Mills Dam will raise the normal water level in the river at the dam site by about 20 feet. This will create a back-pressuring effect on the natural groundwater system, causing a rise in the groundwater table in areas bordering the new impoundment.

b. Modeling. The applicant has conducted a detailed investigation and analysis program to define existing groundwater conditions and to model the expected impacts of dam construction on groundwater levels. This modeling predicts that, without mitigation, increased groundwater levels could result in increased basement seepage and flooding in up to 21 residences in Bradley and Orono, water damage to some building foundations in Orono, increased infiltration into the municipal sewer line in Orono, and impaired residential septic systems in Bradley.

The applicant has used its groundwater model to evaluate various options for mitigating the effects of the anticipated increase in groundwater levels.

c. Mitigation Proposals. The applicant proposes the following groundwater control measures to mitigate impacts of constructing the Basin Mills Dam:

- Installation of an underdrain pipe along Broadway and Water Streets in Orono to reduce sewer line infiltration and basement flooding potential;

- Installation of an underdrain system along Hill and Penobscot Streets in Orono to reduce sewer line infiltration and basement seepage;

- Installation of a sump pit and pump in the commercial building at the south end of Penobscot Street in Orono to control basement seepage;

- Installation of a new interceptor stormwater drain in the Webster area of Orono to reduce the increase in the groundwater table; and

- Construction of a drainage swale in Bradley to reduce basement seepage and impacts on septic systems.

d. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate impacts on groundwater levels, provided that the additional measure discussed below is taken.

By the applicant's own admission, the proposed groundwater control measures are only at the preliminary design stage. Therefore, the applicant must prepare and implement a final groundwater control program, in consultation with the affected municipalities. The applicant must also monitor and maintain any groundwater control measures over the life of the project.

23. HISTORIC AND ARCHAEOLOGICAL RESOURCES

a. Field Investigations. The applicant has conducted Phase I (reconnaissance) and Phase II (site eligibility) surveys to locate and determine the significance of any archaeological sites that might be affected by the construction and/or operation of the project. These surveys have identified a total of five sites as eligible for nomination to the National Register of Historic Places. These sites are referred to as follows:

i. Veazie. Meadow Brook Site, and Eddington Bend Site; and

ii. Basin Mills. Blackman Stream Site, Ayers Rapids 1 Site, and Ayers Rapids 2 Site.

The applicant has also inventoried and evaluated the historical significance of the structures that would be demolished or moved as a result of the construction of the Basin Mills Development. This evaluation has revealed that none of the affected structures are historically significant.

b. Mitigation Plan. The applicant has prepared, in consultation with the Maine Historic Preservation Commission, an archaeological mitigation plan for the Basin Mills Project. This plan consists of: (1) Phase III (data recovery) plans for all five significant archaeological sites; (2) draft text and appropriate documentation for National Register nomination for each site; (3) a plan for monitoring archaeological site integrity for the term of the FERC license; and (4) a memorandum of understanding for the execution of conservation easements on all appropriate sites.

The applicant has also provided joint funding with the University of Maine for construction of the Robert G. McKay Archaeological Lab on the Orono Campus. This facility will house the artifacts that are recovered from the project area, and will allow for further research into the archaeological history of the Penobscot River.

The applicant's mitigation plan has been accepted by the State Historic Preservation Officer.

c. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate impacts on historic and archaeological resources.

24. FLOOD CONTROL BENEFIT/FLOOD HAZARD

a. Existing Conditions.

i. Veazie. The Veazie impoundment is maintained at or near the top of the spillway flashboards (elevation 34.8 feet MSL) during normal operations. Once total turbine capacity is reached (about 7,500 cfs), the impoundment level begins to rise. At about elevation 36 feet MSL, the spillway flashboards begin to fail in sections, which holds the impoundment level stable as flows continue to increase. As river flows exceed about 50,000 cfs, all the flashboards have failed and the impoundment level again begins to rise. Under 100-year flood conditions (river flows of about 145,000 cfs), the impoundment has risen to about elevation 45 feet MSL at the dam, about 10 feet higher than normal.

ii. Basin Mills. Under existing conditions, the 100-year flood level at the proposed Basin Mills dam site is at about elevation 55 feet MSL. At this elevation, the water is about 10 feet deep at the site.

b. Project Impacts: Construction. During construction, temporary cofferdams at both the Veazie and Basin Mills sites will reduce the capacity of the sites to pass river flows. Without appropriate design considerations, flood levels will increase as a result.

c. Project Impacts: Operation.

i. Veazie. The proposed Plant C expansion will shorten the length of the Veazie Dam spillway by about 60 feet. This will reduce the capacity of the dam to pass flood flows. The applicant has calculated that, with Plant C in place, the 100-year flood elevation will increase by about 3/4ths of a foot.

ii. Basin Mills. The proposed new dam will significantly raise normal water levels and flood levels at the dam site. Without appropriate design considerations and mitigation measures, these increases would threaten many existing structures with permanent inundation and periodic flooding.

d. Modeling. The applicant has collected water level and flow measurements at selected locations in the river from the Veazie Dam to the Great Works Dam. This data was used to calibrate a computer model which was then used to predict water levels in the river under different hydraulic and hydrologic conditions.

e. Basin Mills Design. A review of the topography of the area bordering the proposed new impoundment showed that significant impacts due to flooding would not take place if impoundment levels could be kept below elevation 67 feet MSL at the dam.

The proposed dam has been designed to provide sufficient overflow spillway and gated spillway capacities to pass the calculated 500-year flood (river flows of about 177,000 cfs) at elevation 67 feet MSL. In addition, the design provides sufficient hydraulic capacity to prevent any increase in historic flood elevations at the upstream end of the new impoundment.

As designed, the 100-year flood level at the dam will be at elevation 65.5 feet MSL, about 10.5 feet higher than under existing conditions.

f. Proposed Mitigation.

i. Veazie. The applicant has conducted a field survey and determined that there are no existing structures bordering the Veazie impoundment that would be affected by the increase in the 100-year flood level. Therefore, no permanent mitigation is proposed.

During construction, the applicant proposes to design all temporary cofferdams to overtop at specific flow events (10-year or 25-year flood flows).

ii. Basin Mills. The applicant proposes the following flood control measures to mitigate impacts due to the construction of the Basin Mills Dam:

- During construction, designing all temporary cofferdams to overtop at specific flow events (10-year and 25-year flood flows).
- Purchase and removal of six residences on Penobscot Street in Orono, which lie partially within the proposed impoundment area;
- Purchase and flood proofing of the existing Orono-Veazie Water District building on Penobscot Street in Orono, which lies partially within the proposed impoundment area;
- Raising a 500-foot long section of Penobscot Street in Orono to bring the road above the 500 year flood level;
- Filling an area 1,350 feet long between the westerly abutment of the new dam and the existing Orono Dam to elevation 68.5 feet MSL to protect the South Orono residential area from flooding;

- Constructing a 1,120-foot long earthen dike along Penobscot Street in Orono to elevation 68.5 feet MSL to protect the Webster residential area from flooding;

- Funding an upgrade in the size of a Route 178 drainage culvert in Bradley to maintain the discharge capacity into the new impoundment; and

- Filling miscellaneous areas bordering the new impoundment in Orono and Bradley to bring these areas above the 500 year flood level.

g. Discussion and Findings. Based on the evidence in the record, the Board finds that the applicant's proposals will be adequate to mitigate project impacts on flood levels, provided that the additional measure discussed below is taken.

Both the proposed Veazie expansion and the new Basin Mills Dam will result in an increase in existing flood levels, which have been used by the Federal Emergency Management Agency as the basis for flood plain mapping under the National Flood Insurance Program. Therefore, the applicant must prepare for FEMA approval revised flood profiles and floodplain maps based on final project design.

25. HYDROELECTRIC POWER GENERATION

a. Existing Energy Generation.

i. Veazie. The existing Veazie Development generates an average of 60 million kilowatt-hours (KWHrs) of electricity annually. This is equivalent to the energy that would be produced by burning 100,000 barrels of oil or 27,804 tons of coal each year.

ii. Basin Mills. There is currently no power generation at the Basin Mills site.

iii. Orono. The existing Orono Development generates an average of 15 million KWHrs of electricity annually. This is equivalent to the electricity that would be produced by burning 25,000 barrels of oil or 6,951 tons of coal each year.

b. Proposed Energy Generation.

i. Veazie. The proposed Plant C expansion will increase average annual generation at the Veazie Develeopment by 33 million KWHrs. This is equivalent to the energy that would be produced by burning 55,000 barrels of oil or 15,292 tons of coal each year.

ii. Basin Mills. The proposed new Basin Mills Development will generate an average of 178.8 million KWHrs of electricity annually. This is equivalent to the electricity that would be produced by burning 298,000 barrels of oil or 82,854 tons of coal each year.

iii. Orono. The proposed decommissioning of the Orono Development will eliminate all existing electrical generation at the site.

c. Use of Project Power. The applicant is a regulated public utility. All existing and proposed project power is fed to a distribution system for use by the applicant's residential, commercial and industrial customers.

d. Impacts on Existing/Potential Generation.

i. Great Works. The proposed Basin Mills Development could adversely affect energy generation by increasing tailwater elevations, and thus reducing operating head, at the upstream Great Works Project. The applicant proposes to operate the Basin Mills Development to duplicate existing tailwater levels at the Great Works Project under all flow conditions, thus avoiding any impact on generation.

ii. Orono. The construction of the Basin Mills Development will eliminate any potential for continued or expanded generation at the Orono Development.

The applicant has conducted a preliminary feasibility study for the possible redevelopment and relicensing of the existing Orono Project. The alternatives identified and investigated included (1) extending the life of the existing facility, (2) constructing a new powerhouse at the existing powerhouse site, and (3) constructing a new powerhouse downstream from the Basin Mills site. The potential installed capacity for the alternatives ranged from 2.3 MW to 10.8 MW. Assuming a minimum flow requirement of 100-300 cfs in the bypass channel, the estimated average annual energy production for the alternatives ranged from 20 to 50 million KWHrs.

The applicant has concluded that, based on present day economic and environmental criteria, no alternative for the redevelopment of the Orono Project is economically feasible. Based on this conclusion, the applicant has stated that it would propose to decommission the Orono Project even if the Basin Mills Development is not built.

e. Existing Energy Policies/Plans. The State has developed a comprehensive energy plan (Final Report of the Commission on Comprehensive Energy Planning, May 1992) with the goal of meeting the State's energy needs with reliable energy supplies at the lowest possible cost, while ensuring that energy production and use are consistent with a healthy environment and a vibrant economy. Specifically, the Plan establishes the following targets for Maine's energy future:

- Reduce the State's level of dependence on oil from 50 percent to at least match the national average of 43 percent by the year 2000, with further reductions to at least the 30 percent level by 2010;

- Increase the percentage of renewable energy resources in the State's primary energy mix from 30 percent to 40 percent by the year 2000, and to at least 50 percent by 2010;

- Increase statewide energy efficiency relative to 1990 levels by 25 percent by the year 2000 and by at least 50 percent by 2010; and

- Work to stabilize long-term energy prices, in balance with Maine's other energy-related goals, with a specific emphasis on enhancing Maine's competitive position relative to New England and the U.S.

With respect to renewable energy, the Plan recommends that Maine actively encourage the development of wind and solar energy resources and support the continued utilization and further development, where appropriate, of the State's renewable, indigenous hydro and biomass energy resources.

f. Discussion and Findings. Based on the evidence in the record, the Board finds that the project will result in significant hydroelectric energy benefits, including a net increase in generating capacity of 43.7 MW and a net increase in annual energy generation of 196.8 million KWHrs. This increased generation has the potential to displace 328,000 barrels of oil or 91,196 tons of coal used annually as nonrenewable fossil fuels in the generation of electricity.

Conservation Intervenors argue that the energy benefits claimed for the Basin Mills Dam should be reduced by the full amount of the technically feasible expansion potential at the Orono Dam, all of which would be precluded by the construction of the new dam.

The Board finds that it is not appropriate to subtract energy losses from a potential hydro expansion that is technically feasible but may always be economically infeasible. Such an approach as advocated by Conservation Intervenors would always tend to undervalue the real-world energy benefits of any proposed project. Only economically-attractive projects are proposed, while uneconomic ones are shelved. Thus, there is no real-world energy loss from actions that preclude an uneconomic project. Therefore, the Board finds the energy benefits claimed for the Basin Mills Dam, which net out the current generation at the Orono Development, to be accurate.

Moreover, in the present case, the Board finds that subtracting the full energy value of the maximum expansion potential at the Orono Dam will only reduce the net increase in generation from Basin Mills by 35 million KWHrs, to a total of 143.8 million KWHrs. The Board finds that, under these circumstances, the Basin Mills Dam would still result in significant hydroelectric energy benefit.

26. DISSOLVED OXYGEN

a. Existing Conditions. The Penobscot River receives multiple treated industrial and municipal wastewater discharges. Discharges within the project area include the Orono municipal

wastewater treatment plant (outfall located just downstream from the proposed Basin Mills Dam) and the James River Company's industrial wastewater treatment plant (outfall located below the Great Works Dam near the upstream end of the proposed Basin Mills impoundment).

Water quality sampling conducted by the applicant in 1983 and by the DEP in 1983, 1984, 1985, and 1988 indicates that the river currently meets Class B and Class C dissolved oxygen (DO) standards where applicable.

b. Project Impacts.

i. Veazie. The proposed expansion of the Veazie Development will result in a loss of spillage at the Veazie Dam at river flows above 7,500 cfs. This will in turn cause a decline in existing DO levels below the dam at these flows.

ii. Basin Mills. The proposed construction of a new dam at Basin Mills will result in a loss of natural reaeration and an increase in time-of-travel and water temperature, each of which will cause a decline in existing DO levels above and below the dam site.

The new dam and powerhouse will channel river flows to the easterly side of the river. This may reduce mixing of the effluent from the Orono Municipal Waste Water Treatment Plant (WWTP), resulting in locally severe DO depletions.

The proposed removal of the remains of the Bangor Dam will result in decreased time-of-travel and increased natural reaeration, which will in turn cause an increase in existing DO levels below the Veazie Dam.

iii. Orono. The proposed decommissioning of the Orono Development will result in an increase in spillage at the Orono Dam, which will in turn cause an increase in existing DO levels below the dam.

c. Modeling. The DEP Bureau of Water Quality Control has modeled water quality on the river (see "Penobscot River Basin Waste Load Allocation," Mitnik, January 1991). The Bureau's model predicts that, under critical (i.e., worst case) water quality conditions (high water temperature, low flow, and maximum licensed loading), the construction of the proposed Basin Mills Dam will cause a 0.3 parts per million decrease in DO levels in the new impoundment. The Bureau's model also predicts that, under critical conditions, there will be no change in minimum DO levels at the "sag" point (i.e., point of lowest DO) in the river at Winterport as a result of the project.

d. Discussion and Findings. Based on the evidence in the record, the Board finds that that the Basin Mills Project as proposed will not result in violations of applicable Class B and Class C DO standards, provided that the additional measure discussed below is taken.

The construction and operation of the Basin Mills Development has the potential to result in localized DO violations due to inadequate mixing of the Orono WWTP effluent. Therefore, the applicant must monitor this situation following project construction and must be prepared to implement remedial measures as necessary to maintain Class B DO standards in the outfall area.

27. OTHER ENVIRONMENTAL ISSUES

i. Erosion and Sedimentation. Proposed construction activities involve soil disturbance, excavation and filling in and adjacent to the river channel, and disposal of excavated spoils. In addition, the Basin Mills Dam will raise the normal water level along 3.5 miles of river. Without adequate mitigation, these activities will cause erosion and sedimentation which will adversely affect river resources, uses, and water quality.

The applicant has prepared an Erosion and Sedimentation Control Plan (February 1991) which includes the following provisions:

- Control of erosion and sedimentation caused by soil disturbance through the use of silt fences, loam and seed, haybales, drainage ways, sedimentation ponds, and dust-reducing agents.
- Control of sedimentation caused by in-stream construction activities by installing cofferdams during low flow periods, using riprap and filter fabrics to protect cofferdams from erosion, using steel cellular cofferdams in high flow velocity areas, and conducting all in-stream work in the dry wherever possible.
- Control of riverbank erosion caused by higher water levels through placement of riprap protection on 12 acres of shoreline.

The applicant also proposes to utilize some excavated spoils as on-site fill and to dispose of and stabilize excess excavated spoils at suitable off-site locations.

The Board finds that the applicant's proposals will be adequate to control erosion and sedimentation provided that the following additional measures are taken.

Cofferdam fill material must meet DEP-accepted standards for composition and percentage of fines.

The applicant must prepare and implement site-specific plans for spoils disposal and stabilization at off-site locations.

ii. Reservoir Clearing. Higher water levels in the Basin Mills impoundment area will inundate existing shoreline vegetation, causing it to die. Standing and fallen dead trees may impair boating and fishing, site aesthetics, and water quality.

The applicant proposes to clear all trees and brush up to elevation 66 feet MSL (2 feet above full pond) along those steep bank areas of the new impoundment which could experience bank failure. In gentle and flat slope bank areas, the applicant

proposes to leave the trees and brush to benefit nesting waterfowl and other wildlife.

Based on the evidence in the record, the Board approves the applicant's proposal to clear vegetation from the Basin Mills impoundment area.

iii. Visual Impact. The applicant has conducted an assessment of the visual impact of the proposed project. The largest impacts are expected to result from construction of Veazie Plant C, construction of the new Basin Mills Dam and powerhouse, removal of trees along the new impoundment, removal of six houses in Orono, removal of the Orono powerhouse and penstocks, and creation of a new impoundment.

The applicant concludes that the cumulative visual impact of the project will be positive due to increased viewing access to the river and to increased visual contrast.
Based on the evidence in the record, the Board finds that the project will not have a negative visual impact.

iv. Orono Impoundment Study. At the request of the DEP, the applicant conducted a study to evaluate the impacts on natural and cultural resources that would result from modifying or removing the Orono Dam following the construction of the Basin Mills Dam and the decommissioning of the Orono powerhouse.

Based on its study, the applicant concludes that lowering the existing impoundment would not result in any significant benefits to water quality or fish and wildlife habitat. The applicant also concludes that any impoundment lowering would adversely affect existing recreational access and use. Consequently, the applicant proposes to maintain the existing Orono Dam and impoundment following decommissioning of the Orono powerhouse.

Based on the evidence in the record, the Board concurs with the applicant's conclusions and approves its proposal regarding the Orono Dam.

v. Process Water Impacts. Unavoidable sedimentation during construction of the Basin Mills Dam has the potential to degrade the quality of the process water currently withdrawn from the river by the Striar Brothers Textile Mill, which is located on Ayers Island.

The applicant proposes to construct a temporary process water intake upstream from the Basin Mills construction area and install a temporary pipeline to provide clean process water to the mill on a continual basis during project construction.

Based on the evidence in the record, the Board approves the applicant's proposal to provide process water to the Striar Mill.

vi. Water Temperature. The Penobscot Indian Nation contends that impounding the river behind the proposed Basin Mills Dam will increase daily minimum and average daily water temperatures, which will adversely affect upstream migrating salmon.

The Board finds that there is no convincing evidence in the record that the creation of the Basin Mills impoundment will, in and of itself, significantly increase existing water temperatures or significantly affect migrating salmon. However, the Board finds that current summer water temperatures in the lower Penobscot River sometimes exceed preferred temperatures for salmon, and that such temperatures can lead to stress, migratory delays, and death in the fish.

Therefore, the applicant must conduct a post-construction study of the effects of ambient water temperatures throughout the lower Penobscot River on migrating salmon and must be prepared to implement any mitigation measures deemed appropriate and necessary by the DEP to reduce these effects.

vii. Concrete Toxicity. Fresh concrete can be toxic to fish and other aquatic life if placed in direct contact with surface waters prior to curing.

Therefore, the applicant must take appropriate precautions during project construction to ensure that fresh concrete does not come into contact with river water.

28. ENVIRONMENTAL/ENERGY BALANCING

i. General. DEP's Chapter 450 Administrative Regulations for Hydropower Projects provide that the environmental and energy considerations or "balancing" criterion of the MWDCA (38 MRSA § 636.7) is satisfied if, in the Board's judgment, the applicant has demonstrated that the weight of the advantages of the project is greater than the weight of the direct and cumulative adverse impacts over the life of the project based on the specified environmental and energy considerations. The Regulations further provide that determining whether the advantages of a project are greater than its adverse impacts requires attaching value or weight to the project's various benefits and harms.

ii. Veazie. Based on the preponderance of the evidence in the record, the Board finds that the proposed Veazie Development, as proposed and conditioned by this order, will result in environmental and energy benefits that outweigh its adverse impacts.

iii. Basin Mills. DEP's Chapter 450 Regulations require that, where a new dam would result in substantial adverse impacts, a demonstration that the balancing criterion is met must include consideration of the environmental and energy benefits and harms that would result from any alternative source(s) of energy generation or conservation that might reasonably be pursued if the dam is not built.

The applicant has evaluated the environmental and energy benefits and harms of the proposed Basin Mills Dam and the lowest cost energy alternative to the new dam. The applicant concludes that the dam as proposed (i.e., including all proposed mitigation) will have significant energy, environmental, and air quality benefits.

Based on the preponderance of the evidence in the record, the Board finds that the Basin Mills Development, as proposed and conditioned by this order, will result in environmental and energy benefits that outweigh its adverse impacts. The factors considered in this balancing include the impact of the project, including all proposed mitigation and additional mitigation as discussed in this order, on soil stability, wetlands, the natural environment of surface waters and their shorelands, fish and wildlife resources, historic and archaeological resources, public access to and use of surface waters, flood control, and hydroelectric energy generation.

29. ANTIDEGRADATION

i. Existing In-stream Uses. The statutory standards for the Department's consideration of existing in-stream uses are established in 38 MRSA § 464(4)(F)(1) and (1-A). These standards are summarized below.

Existing in-stream water uses and the level of water quality necessary to protect those in-stream uses shall be maintained and protected. Existing in-stream water uses are those uses which have actually occurred on or after November 28, 1975, in or on a water body.

Determinations of what constitutes an existing in-stream water use on a particular water body shall be made on a case-by-case basis by the Department and shall include consideration of the designated uses for the waterbody and:

(a) Aquatic, estuarine and marine life present in the water body;

(b) Wildlife that utilize the water body;

(c) Habitat, including significant wetlands, within a water body supporting existing populations of wildlife or aquatic, estuarine or marine life, or plant life that is maintained by the water body;

(d) The use of the water body for recreation in or on the water, fishing, water supply, or commercial activity that depends directly on the preservation of an existing level of water quality; and

(e) Any other evidence which, for the uses described under (a), (b), and (c) above, demonstrates their ecological significance because of their role or importance in the functioning of the ecosystem or their rarity and, for the use described under (d) above, demonstrates its historical or social significance.

Where the existing in-stream use involves use of the water body by a population of plant life, wildlife, or aquatic, estuarine or marine life, or as aquatic, estuarine, marine, wildlife or plant habitat, the Department may only approve water quality certification when it finds that the applicant has demonstrated that the proposed activity would not have a significant impact on the existing use. Significant impact means impairing the

viability of the existing population, including significant impairment to growth and reproduction or an alteration of the habitat which impairs viability of the existing population.

Where the existing in-stream use involves use of the water body for recreation in or on the water, fishing, water supply or commercial enterprises that depend directly on the preservation of an existing level of water quality, the Department may only approve water quality certification when it finds that the applicant has demonstrated that the proposed activity would not result in significant degradation of the existing use.

ii. High Quality Waters. 38 MRSA § 464(4)(F)(2) provides that, where high quality waters of the State constitute an outstanding national resource, that water quality shall be maintained and protected. For purposes of this provision, outstanding national resource waters include water bodies located in national and state parks and wildlife refuges and in public reserved lands, and those water bodies classified as Class AA or Class SA.

iii. Water Quality Certification. 38 MRSA § 464(4)(F)(3) provides that the Department may only approve water quality certification if all the standards of classification of the water body and the requirements of the antidegradation policy are met. The Department may approve water quality certification for a project affecting a water body in which the standards of classification are not met if the project does not cause or contribute to the failure of the water body to meet the standards.

iv. Reclassification. 38 MRSA § 464(4)(F)(4) provides that, where the actual quality of any classified water exceeds the minimum standards of the next highest classification, that higher water quality shall be maintained and protected. In such a case, the Board is required to recommend to the Legislature that the water body be reclassified in the next higher classification.

v. Lowering of Existing Water Quality. 38 MRSA § 464(4)(F)(5) provides that the Department may only approve water quality certification which would result in lowering the existing quality of any water body after making a finding that the action is necessary to achieve important economic or social benefits to the State and where all the standards of classification and the requirements of the antidegradation policy are met.

vi. Discussion and Findings.

a. Veazie.

Existing In-stream Uses. The Board finds that existing in-stream water uses in the Veazie Development area include: fishing, especially for Atlantic salmon; habitat for wildlife, aquatic life, and plant life; and migratory pathway for anadromous fish. The Board finds that recreational boating and swimming are not significant existing uses in the area.

Based on the preponderance of the evidence in the record and the findings presented elsewhere in this order, the Board finds

that the Veazie Plant C expansion will not have a significant impact on the use of the waters affected by the development by plant life, wildlife, or aquatic, estuarine or marine life or as aquatic, estuarine, marine, wildlife or plant habitat, in that the development, as proposed and conditioned by this order, will not impair the viability of the existing populations in the affected waters. Specifically, the Board finds that, with the mitigation required by this order, the Plant C expansion will result in an increase in habitat values for juvenile salmon, shad spawners and juveniles, and all life stages of smallmouth bass in the river immediately below the Veazie Dam, and further will result in improved fish passage at the site.

The Board also finds that the Veazie Plant C expansion will not result in significant degradation of the use of the waters affected by the development for recreation in or on the water, fishing, water supply or commercial enterprises that depend directly on the preservation of an existing level of water quality.

Specifically, with respect to Atlantic salmon fishing, the Board finds that the applicant has presented convincing evidence that the proposed Plant C expansion, with appropriate mitigation, will not materially affect overall angling opportunity in this area. Successful salmon angling presently occurs below the Veazie Dam under a wide range of water flow, depth, and velocity conditions. This will continue to be the case with Plant C in operation.

With respect to other fishing, the Board finds that the construction and operation of Veazie Plant C will result in the creation of an undetermined amount of additional angling opportunity for shad and striped bass in the tailrace area.

High Quality Waters. The Board finds that none of the waters in the Veazie Development area are classified as Class AA or Class SA or are located in national or state parks or wildlife refuges or in public reserved lands. Therefore, the Board finds that there are no outstanding national resource waters that will be affected by the development.

Water Quality Certification. Based on the preponderance of the evidence in the record, the Board finds that the construction and operation of the Veazie Development, as proposed and conditioned by this order, will not result in a violation of the standards of classification for waters affected by the development, and will meet the requirements of the antidegradation policy.

Reclassification. The waters affected by the Veazie development are classified as Class B (impoundment waters and tailwaters down to the railroad bridge in Bangor-Brewer) and Class C (below the Bangor-Brewer railroad bridge). Based on the evidence in the record, the Board finds that there are no waters affected by the development that currently exceed all the minimum standards of the next highest classification. Therefore, the Board finds that the quality of the waters

affected by the Veazie Development is not subject to protection and reclassification to the next higher classification.

Lowering of Existing Water Quality. The Board finds that the construction and operation of the proposed Veazie Plant C expansion will result in a small decline in existing dissolved oxygen levels in the river below the Veazie Dam at flows above 7,500 cfs, due to the loss of spillage at the dam. Dissolved oxygen levels, however, will continue to meet applicable Class B and Class C standards.

Based on the preponderance of the evidence in the record and the findings presented elsewhere in this order, the Board finds that the lowering of existing dissolved oxygen levels in the river below the Veazie Dam due to the construction and operation of the Veazie Plant C expansion is necessary to achieve important economic or social benefits to the State, in that the Veazie Plant C expansion, as proposed and conditioned by this order, will result in significant economic benefits to the public and in environmental and energy benefits that outweigh its adverse impacts.

Specifically, the Board finds that the Veazie Development will generate primary economic benefits (customer savings and indirect benefits) of $171 million, and other economic benefits (income from construction, operation and maintenance, and property tax benefits) of $81 million, over the term of a new license. The Board further finds that the construction of the proposed Plant C expansion will create up to 66 direct and 57 indirect jobs a year over a 3-year construction period.

b. Basin Mills.

Existing In-stream Uses. The Board finds that existing in-stream water uses in the Basin Mills Development area include: habitat for wildlife, aquatic life and plant life, including nursery habitat for Atlantic salmon and significant wetlands; a migratory pathway for anadromous fish; and industrial process water supply. The Board finds that recreational fishing, boating and swimming are not significant existing uses in the area.

Based on the preponderance of the evidence in the record and the findings presented elsewhere in this order, the Board finds that the Basin Mills Development will not have a significant impact on the use of the waters affected by the development by plant life, wildlife, or aquatic, estuarine or marine life or as aquatic, estuarine, marine, wildlife or plant habitat, in that the development, as proposed and conditioned by this order, will not impair the viability of the existing populations in the affected waters.

Specifically, with respect to nursery habitat for Atlantic salmon, the Board finds that, while the construction of the Basin Mills Dam will result in the loss of up to 9,329 salmon nursery habitat units, the affected habitat represents only a small percentage of the available salmon spawning and nursery habitat in the Penobscot River system. The Board further finds

that the affected habitat is not of high value, and that full and successful utilization of this habitat is not occurring now and is unlikely to occur in the future. Finally, the Board finds that the applicant's stocking proposal will more than compensate for any loss of natural salmon reproduction in the area affected by the Basin Mills Dam.

Further, with respect to other fish habitat, the Board finds that the construction of the Basin Mills Dam will result in improved habitat suitability for shad and smallmouth bass in the impoundment area and improved habitat suitability for salmon, shad, alewife and smallmouth bass in the Orono bypass channel.

Further, with respect to anadromous fish migration, the Board is persuaded by the evidence in the record that, by decreasing delays and inefficiencies in upstream fish passage, the applicant's trap and truck proposal will result in more salmon reaching prime spawning areas, which will in turn lead to more natural reproduction in the river, which will lead--all other things being equal--to larger returns of adult salmon. The ASAL model shows an increase in the probability of successful restoration when comparing the future with the Basin Mills Dam and trap and truck against the future without the dam. The Board also finds that the applicant's proposal for trapping and trucking of shad and alewife will increase the numbers of these fish in the river in the short-term and will improve the chances of successful restoration of these species in the long run.

Further, with respect to wildlife, the Board finds that the construction of the Basin Mills Dam, as currently proposed, will result in an increase in wildlife habitat values in the project area.

Finally, with respect to wetlands, the Board finds that, while construction of the Basin Mills Dam will cause the permanent loss of 11.7 acres of wetlands, the applicant's proposals to restore, enhance, preserve, and create wetlands within the project area will compensate for lost wetland functions at an overall ratio of 4.65 to 1 of mitigation acres to impacted acres.

The Board also finds that the Basin Mills Development will not result in significant degradation of the use of the waters affected by the project for recreation in or on the water, fishing, water supply or commercial enterprises that depend directly on the preservation of an existing level of water quality.

Specifically, with respect to recreation in or on the water, the Board finds that the applicant's proposals to construct recreational facilities in the Basin Mills area will greatly improve public recreational access to, and resulting use of, the river between the Veazie Dam and the upstream Great Works Dam.

Further, with respect to salmon fishing, while construction of the Basin Mills Dam will result in the loss of up to 38 potential salmon lies, the Board finds that there is little salmon angling presently occurring in the area that would be affected by the proposed Basin Mills Dam. While public access to this area is currently very limited, it is likely that fishing would have become established here if salmon, which are present, were being caught. Thus, while a number of potential lies have been identified based on physical and subjective evaluations by experts, there is no convincing evidence in the record that there will be any significant amount of successful salmon angling between the Veazie Dam and the Great Works Dam with or without construction of the Basin Mills Dam. Therefore, the effect of the dam on salmon angling will likely be minimal. The Board also finds that the applicant's proposal to create artificial salmon lies in the Basin Mills tailrace is both feasible and practical, and that such mitigation is appropriate and workable here.

Further, with respect to other fishing, the Board finds that construction of the Basin Mills Dam will result in the creation of an undetermined amount of additional shad and smallmouth bass angling opportunity.

Finally, with respect to industrial process water supply, the Board finds that, while sedimentation during construction of the Basin Mills Dam has the potential to degrade the quality of the process water currently withdrawn from the river by the Striar Brother Textile Mill, the applicant has made adequate provisions to install a temporary pipeline to provide clean process water to the mill during project construction.

High Quality Waters. The Board finds that none of the waters in the Basin Mills Development area are classified as Class AA or Class SA or are located in national or state parks or wildlife refuges or in public reserved lands. Therefore, the Board finds that there are no outstanding national resource waters that will be affected by the development.

Water Quality Certification. Based on the preponderance of the evidence in the record, the Board finds that the construction and operation of the Basin Mills Development, as proposed and conditioned by this order, will not result in a violation of the standards of classification for waters affected by the development, and will meet the requirements of the antidegradation policy.

Reclassification. The waters affected by the Basin Mills Development are classified as Class B (impoundment waters and tailwaters down to the railroad bridge in Bangor-Brewer) and Class C (below the Bangor-Brewer railroad bridge). Based on the evidence in the record, the Board finds that there are no waters affected by the development that currently exceed all the minimum standards of the next highest classification. Therefore, the Board finds that the quality of the waters affected by the Basin Mills Development is not subject to protection and reclassification to the next highest classification.

Lowering of Existing Water Quality. The Board finds that the construction and operation of the proposed Basin Mills Development will result in a small decline in existing dissolved oxygen levels in the river above and below the new dam, due to the loss of natural reaeration and an increase in time-of-travel and water temperature. Dissolved oxygen levels, however, will continue to meet applicable Class B and Class C standards.

Based on the preponderance of the evidence in the record and the findings presented elsewhere in this order, the Board finds that the lowering of existing dissolved oxygen levels in the river due to the construction and operation of the Basin Mills Dam is necessary to achieve important economic or social benefits to the State, in that the Basin Mills Development, as proposed and conditioned by this order, will result in significant economic benefits to the public, and will result in environmental and energy benefits that outweigh its adverse impacts.

Specifically, the Board finds that the Basin Mills Development will generate primary economic benefits of $183.3 million, and other economic benefits of $202.2 million, over the term of a new license. The Board further finds that the construction of the new dam will create up to 231 direct and 177 indirect jobs a year over a 4-year construction period. Finally, the Board finds that the development, as proposed and conditioned by this order, will have significant energy, environmental and air quality benefits.

CONCLUSIONS

BASED on the above Findings of Fact, and the evidence contained in the application and supporting documents, and subject to the Conditions listed below, the Board makes the following CONCLUSIONS pursuant to the Maine Waterway Development and Conservation Act, 38 MRSA §§ 630-637, the Maine Water Classification Program, 38 MRSA §§ 464, and Section 401 of the Federal Clean Water Act, 33 U.S.C. §1341:

1. The applicant has the financial capability and technical ability to undertake the project provided that the applicant demonstrates financial capability sufficient to cover the costs of project construction and operation prior to beginning project construction.

2. The applicant has made adequate provisions for protection of public safety.

3. The project will result in significant economic benefits to the public provided that the applicant obtains a certificate of public convenience and necessity for the project from the Maine Public Utilities Commission prior to beginning project construction.

4. The applicant has made adequate provisions for traffic movement into or out of the development area provided that all traffic control measures, an Advance Transportation Route Plan, and a park and ride system are implemented as proposed and agreed to by the applicant.

BANGOR HYDRO-ELECTRIC COMPANY BRADLEY, EDDINGTON, OLD TOWN, ORONO & VEAZIE, PENOBSCOT COUNTY, MAINE BASIN MILLS HYDRO PROJECT #L-16880-35-D-N (APPROVAL)	)))))))	59 MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT; MAINE WATER QUALITY PROGRAM; FEDERAL CLEAN WATER ACT NEW PERMIT AND WATER QUALITY CERTIFICATION

5. The proposed activity is not located within the jurisdiction of the Maine Land Use Regulation Commission.

6. The applicant has made reasonable provisions to realize the environmental benefits and to mitigate the adverse environmental impacts of the project, provided that the project is constructed and operated as proposed and as conditioned by this order.

7. The advantages of the project are greater than the direct and cumulative adverse impacts over the life of the project, provided that:

   - Water levels and flows at the project dams are maintained as proposed;
   - Fish passage is maintained during project construction as proposed;
   - Improvements to the existing Veazie fishway are made as proposed;
   - Upstream and downstream fish passage facilities are provided at the Veazie Dam as proposed;
   - Downstream fish passage facilities are provided at the Basin Mills Dam as proposed, and upstream fish passage facilities consisting of either a vertical slot fishway or a fishlift are provided at both the Basin Mills powerhouse and spillway;
   - A study is conducted to evaluate the economic, environmental and social costs and benefits of removing the Howland Dam, and the removal of the dam is proposed and pursued through all appropriate regulatory agencies if required by the Board;
   - A study is conducted to determine the need for an additional fishway at Veazie Plant B;
   - At least 30,000 high quality, disease-free salmon smolts are stocked annually in the Penobscot River for the full license term of the project;
   - A plan is prepared and implemented to completely remove the Bangor Waterworks Dam and to preserve the dam site from future development;
   - A plan is prepared and implemented to provide all necessary funds or other resources for the Atlantic Sea Run Salmon Commission and the Department of Marine Resources to trap and truck up to 12,000 salmon, 30,000 shad, and 150,000 alewife annually from the Veazie Dam to above the Milford Dam;
   - A study is conducted to determine the effectiveness of the trap and truck program;
   - A trust fund is established for salmon managment activities on the Penobscot river, with annual contributions by the applicant of $100,000 per year, as adjusted by inflation, for the full licnese term of the project;

BANGOR HYDRO-ELECTRIC COMPANY BRADLEY, EDDINGTON, OLD TOWN, ORONO & VEAZIE, PENOBSCOT COUNTY, MAINE BASIN MILLS HYDRO PROJECT #L-16880-35-D-N (APPROVAL)	60 MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT; MAINE WATER QUALITY PROGRAM; FEDERAL CLEAN WATER ACT NEW PERMIT AND WATER QUALITY CERTIFICATION

- A study is conducted to determine the need for upstream fish passage at the Orono Dam;
- Recreational access facilities are constructed and maintained as proposed, and a canoe portage trail is constructed and maintained around the Veazie Dam;
- A plan is prepared and implemented to evaluate the adequacy of recreational access to the project area;
- Plans are prepared and implemented to preserve the west shore of the river below the Veazie Dam for shore angling and to provide appropriate facilities for public access to this area;
- A hydraulic modeling study is conducted and the Veazie Plant C tailrace is designed and constructed to minimize the effect of Plant C discharges on existing angling opportunity;
- A plan is prepared and implemented to operate the Veazie Development in such a manner as to maximize angling opportunity without unacceptably impairing fish passage;
- Plans are prepared and implemented to construct salmon lies in the Veazie Plant C and Basin Mills tailraces and in the Bangor Dam impoundment area, and to monitor the effectiveness and permanence of the lies constructed;
- A report is submitted on the angling opportunity created by the removal of the Bangor Dam;
- A plan is prepared and implemented to undertake and monitor all proposed wetland restoration, enhancement, preservation, and creation measures;
- A final groundwater control program is prepared and implemented, and all groundwater control measures are monitored and maintained over the life of the project;
- The archaeological mitigation plan is implemented as proposed;
- Flood control measures are undertaken as proposed;
- Revised flood profiles and floodplain maps are prepared for the project area based on final project design;
- Actions are taken to monitor and implement remedial measures as necessary to maintain Class B dissolved oxygen standards in the river in the vicinity of the Orono waste water treatment plant discharge;
- Erosion and sedimentation from project construction and operation are controlled as proposed;
- Cofferdam fill material meets DEP-accepted standards;
- Plans are prepared and implemented to dispose of and stabilize construction spoils at suitable off-site locations;

BANGOR HYDRO-ELECTRIC COMPANY BRADLEY, EDDINGTON, OLD TOWN, ORONO & VEAZIE, PENOBSCOT COUNTY, MAINE BASIN MILLS HYDRO PROJECT #L-16880-35-D-N (APPROVAL)	)))))))	61 MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT; MAINE WATER QUALITY PROGRAM; FEDERAL CLEAN WATER ACT NEW PERMIT AND WATER QUALITY CERTIFICATION

- The Basin Mills reservoir area is cleared of vegetation as proposed;
- Process water is provided to the Striar Textile Mill during project construction as proposed;
- A post-construction study is conducted to determine the effects of ambient water temperatures in the lower Penobscot River on migrating salmon; and
- Fresh concrete does not come in direct contact with river water during project construction.

8. There is a reasonable assurance that the project will not violate applicable water quality standards provided that the project is constructed and operated as proposed and as conditioned by this order.

ORDER AND CONDITIONS

THEREFORE, the Board APPROVES the application of BANGOR HYDRO-ELECTRIC COMPANY to construct and operate the BASIN MILLS HYDRO PROJECT, as described above, and GRANTS certification that there is a reasonable assurance that the construction and operation of the BASIN MILLS HYDRO PROJECT, as described above, will not violate applicable water quality standards, SUBJECT TO THE FOLLOWING CONDITIONS:

1. STANDARD CONDITIONS

The Standard Conditions of Approval apply, except for Condition 5, for the construction, reconstruction or structural alteration of a hydropower project (06-096 CMR Chapter 450.9(C), effective date September 31, 1987), copy attached.

2. FINANCIAL CAPACITY

Prior to the commencement of project construction, the applicant shall submit evidence of the availability and commitment of funds sufficient to construct and operate the project as conditioned by this approval. This evidence shall include a total project cost estimate in current dollars and any plans to convert short-term construction borrowing to long-term financial securities or to third-party lease/joint venture arangements. This evidence must be reviewed by and receive approval of the DEP Bureau of Land Quality Control prior to commencement of project construction.

3. CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

Prior to the commencement of project construction, the applicant shall obtain and shall submit to the DEP a certificate of public convenience and necessity from the Maine Public Utilities Commission for the Veazie Development and the Basin Mills Development.

4. TRAFFIC CONTROL

A. The applicant shall implement all temporary traffic control measures as recommended by the Maine Department of Transportation to alleviate traffic congestion during project construction.

B. The applicant shall develop, implement and promote an Advance Transportation Route Plan and a Park and Ride or mass transit system to distribute the timing and routing of construction traffic and to minimize the additional traffic created by construction workers.

C. The applicant shall submit a Transportation Route Plan and a plan for a Park and Ride or mass transit system as required by Part B of this condition. These plans shall be submitted prior to the commencement of project construction or upon such schedule as may be established by FERC. These plans shall be prepared in consultation with MDOT, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of project construction.

5. WATER LEVELS AND FLOWS

A. Except as temporarily modified by approved maintenance activities or by operating emergencies beyond the applicant's control, as described below, water levels and flows shall be maintained at the Veazie, Basin Mills, and Orono Dams as proposed and described in Section 8 of this approval.

B. The applicant shall submit a plan to monitor and maintain water levels and flows as required by Part A of this condition. This plan shall be submitted prior to the commencement of project operation or upon such schedule as may be established by FERC. This plan shall be prepared in consultation with state and federal fisheries agencies, the Penobscot Indian Nation, and the U.S. Geological Survey, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of project operation.

C. Operating emergencies beyond the applicant's control include, but are not limited to, equipment failure or other temporary abnormal operating conditions, flashboard failure, generating unit operation or interruption under power supply emergencies, and orders from local, state or federal law enforcement or public safety officials.

6. FISH PASSAGE

A. The applicant shall take all necessary measures to ensure that adequate upstream and downstream fish passage is provided during project construction at the Veazie and Basin Mills Dams. These measures shall include, but may not be limited to, maintaining operation of the existing Veazie Dam fishway, installing a steeppass Denil fishway at the Basin Mills Dam, and maintaining spill or free-flowing conditions at each of the dams.

B. The applicant shall undertake improvements to the existing Veazie fishway and shall install, maintain and operate permanent upstream

and downstream fish passage facilities at the Veazie and Basin Mills Dams as proposed and as described in Section 16(e) of this approval, as modified to include installation of either a vertical slot fishway or a fishlift at both the Basin Mills Dam powerhouse and spillway.

C. The applicant shall submit function design drawings, construction schedules, and operating and maintenance plans for all fish passage facilities required by Part B of this condition. These filings shall be submitted prior to the commencement of project construction or upon such schedule as may be established by FERC. These filings shall be prepared in consultation with state and federal fisheries agencies and the Penobscot Indian Nation and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to construction of the fish passage facilities.

7. FISH PASSAGE STUDIES

A. The applicant shall, in consultation with state and federal fisheries agencies and the Penobscot Indian Nation, conduct post-construction studies to determine the need for (1) an additional fishway at Veazie Plant B and (2) a fishway at the Orono Dam.

B. The applicant shall submit a plan and schedule to study fishway needs as required by Part A of this condition. These filings shall be submitted prior to the commencement of project operation or upon such schedule as may be established by FERC. These filings shall be prepared in consultation with state and federal fisheries agencies and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of project operation.

C. The applicant shall submit the results of the fishway studies required by Part A of this condition, along with any recommendations for additional fishways at Veazie Plant B and/or the Orono Dam, to the DEP and to all consulting agencies. These results shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. The Department reserves the right, after notice and opportunity for hearing, and after reviewing the comments of the consulting agencies, to require such additional fishways as are deemed necessary to effectively and efficiently pass anadromous fish upstream through the Veazie and Orono Dams.

8. SALMON STOCKING

A. The applicant shall stock at least 30,000 high quality, disease-free salmon smolts, or biologically equivalent numbers of salmon fry or parr, in the Penobscot River each year for the full term of the FERC license for the project. This stocking shall occur at such times and places as are determined by the Atlantic Sea Run Salmon Commission.

B. The applicant shall submit a plan to stock salmon as required by Part A of this condition. This plan shall be submitted prior to the commencement of project operation or upon such schedule as may be established by FERC. This plan shall include provisions for obtaining and transporting suitable salmon smolts, which shall be

the progency of Penobscot River brood stock unless otherwise approved by the ASRSC. This plan shall be prepared in consultation with the ASRSC, the U.S. Fish & Wildlife Service, and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of Basin Mills operation.

9. BANGOR DAM REMOVAL

A. The applicant shall completely remove the remains of the breached Bangor Waterworks Dam to improve fish passage and restore fish habitat and angling opportunity. The applicant shall take all necessary actions to preserve the site of the Bangor Waterworks Dam from future development after the dam is removed. Such actions may include, without limitation, the acquisition of the dam site by purchase or by exercise of eminent domain under the terms of a FERC license, and/or by the imposition of appropriate deed restrictions.

B. The applicant shall submit a plan to remove the Bangor Dam and to preserve the dam site as required by Part A of this condition. This plan shall be submitted prior to the commencement of Basin Mills operation or upon such schedule as may be established by FERC. This plan shall include a description of and schedule for demolition activities and plans for spoils disposal and stabilization. This plan shall be prepared in consultation with state and federal fisheries agencies, the Penobscot Indian Nation, and the City of Bangor, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of Basin Mills operation.

C. The applicant shall, in consultation with local salmon fishing clubs and the Atlantic Sea Run Salmon Commission, monitor the salmon angling opportunity created by the removal of the Bangor Dam.

D. The applicant shall submit a plan to monitor the salmon angling opportunity created by this removal. This plan shall be submitted prior to completion of removal of the dam. The plan shall be prepared in consultation with local salmon fishing clubs and the ASRSC, and must be reviewed and approved by the DEP Bureau of Land Quality Control.

E. The applicant shall submit a report on the angling opportunity created by the removal of the Bangor Dam, along with any recommendations for additional restoration or enhancement of salmon angling opportunity, to the DEP, the ASRSC, and all consulting fishing clubs. This report shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. The Department reserves the right, after notice and opportunity for hearing, and after reviewing the comments of all consulting agencies and fishing clubs, to require creation of additional artificial salmon lies or implementation of additional riverine modifications as are deemed necessary to fully restore and enhance salmon angling opportunity in the river between the Bangor Salmon Pool and the Eddington Bend Pipeline.

BANGOR HYDRO-ELECTRIC COMPANY BRADLEY, EDDINGTON, OLD TOWN, ORONO & VEAZIE, PENOBSCOT COUNTY, MAINE BASIN MILLS HYDRO PROJECT #L-16880-35-D-N (APPROVAL)	)))))))	65 MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT; MAINE WATER QUALITY PROGRAM; FEDERAL CLEAN WATER ACT NEW PERMIT AND WATER QUALITY CERTIFICATION

10. ANADROMOUS FISH TRAP AND TRUCK PROGRAM

A. The applicant shall provide all necessary funds or other resources for the Atlantic Sea Run Salmon Commission and the Department of Marine Resources to trap and truck up to 12,000 salmon, 30,000 shad, and 150,000 alewife annually from the Veazie Dam to a point in the river upstream from the Milford Dam for the full term of the FERC license for the project. The ASRSC and DMR shall continue to be responsible for the management of all anadromous fish restoration activities on the river, including, without limitation, the trapping, sorting and trucking of fish, the timing and location of the release of trucked fish, and the release of fish from the Veazie trap to provide upstream angling opportunity.

B. The applicant shall submit a plan to provide funding or other resources for the trapping and trucking of anadromous fish as required by Part A of this condition. This plan shall be submitted prior to the commencement of project operation or upon such schedule as may be established by FERC. This plan shall be prepared in consultation with state and federal fisheries agencies and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of Basin Mills operation.

11. TRAP AND TRUCK STUDY

A. The applicant shall, in consultation with state and federal fisheries agencies and the Penobscot Indian Nation, conduct a study to evaluate the effectiveness of the trap and truck program required by this approval.

B. The applicant shall submit a plan and schedule to study the effectiveness of the trap and truck program as required by Part A of this condition. This plan shall be submitted prior to the commencement of the trap and truck program or upon such schedule as may be established by FERC. The plan shall include, but may not be limited to, provisions to evaluate stess and mortalities due to trapping and trucking operations, the fallback of trucked fish, and mechanical and other operational problems. These submittals shall be prepared in consultation with state and federal fisheries agencies and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of the trap and truck program.

C. The applicant shall submit the results of the trap and truck study required by Part A of this condition, along with any recommendations for changes in the approved trap and truck program, to the DEP and to all consulting agencies. These results shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. The Department reserves the right, after notice and opportunity for hearing, and after reviewing the comments of the consulting agencies, to require such changes in the approved program as are deemed necessary to effectively trap and truck anadromous fish from the Veazie Dam.

12. FUNDING FOR SALMON MANAGEMENT ACTIVITIES

The applicant shall establish a trust fund to be administered by the Atlantic Sea Run Salmon Commission or any successor agency for the full term of the FERC license for the project for salmon management activities on the Penobscot River. Such activities may include, but need not be limited to, fish monitoring, genetic sampling and evaluation, habitat improvement or protection, and other enhancement or mitigation activities intended to improve the quality and quantity of the Penobscot River salmon run. The applicant's contributions to the trust fund shall be in the amount of $100,000 for the first year of the license, and shall be increased or decreased each succeeding year of the license by the inflation rate, as measured by the Consumer Price Index, for the previous year. The trust fund will be administered by the ASRSC based on that agency's best professional judgment.

13. RECREATIONAL ACCESS

A. The applicant shall construct and maintain recreational access facilities in the project area as proposed and as described in Section 17(b) of this order, shall take all necessary actions to preserve and provide public access facilities to the shoreline on the west side of the river below the Veazie Dam for shore angling, and shall construct and maintain a canoe portage trail around the Veazie Dam.

B. The applicant shall submit a plan and schedule to construct and maintain the recreational facilities required by Part A of this condition. The plan shall be submitted prior to the commencement of project operation or upon such schedule as may be established by FERC. The plan shall include final design drawings, a description of all construction activities, and facilities maintenance plans. These submittals shall be prepared in consultation with the Department of Conservation, the Maine Historic Preservation Commission and all affected municipalities, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to construction of the recreational facilities.

14. RECREATIONAL ACCESS EVALUATION

A. The applicant shall, in consultation with the Department of Conservation and the affected municipalities, conduct a periodic evaluation of the adequacy of recreational access to the project area for the full term of the FERC license. This evaluation shall be conducted in conjunction with the requirements of FERC form 80.

B. The applicant shall submit a plan to periodically evaluate the adequacy of recreational access as required by Part A of this condition. This plan shall be submitted within 6 months following construction of all required recreational access facilities. This plan shall be prepared in consultation with DOC and the affected municipalities, and must be reviewed and approved by the DEP Bureau of Land Quality Control.

C. The applicant shall submit the results of the periodic evaluations of recreational access required by Part A of this condition, along

with any recommendations for additional or expanded recreational access facilities, to the DEP and all consulting agencies and municipalities. These results shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. The Department reserves the right, after notice and opportunity for hearing, and after reviewing the comments of the consulting agencies and municipalities, to require such additional or expanded recreational access facilities as are deemed necessary to meet identified access needs.

15. ANGLING OPPORTUNITY

A. The applicant shall create artificial salmon lies in the Veazie Plant C tailrace and in the Basin Mills tailrace to mitigate for project impacts on angling opportunity.

B. The applicant shall submit a plan detailing the creation of salmon lies as required by Part A of this condition. This plan shall be submitted prior to project operation or upon such schedule as may be established by FERC. This plan shall be prepared in consultation with the Atlantic Sea Run Salmon Commission, the U.S. Fish & Wildlife Service, and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to creation of the salmon lies.

C. The applicant shall, in consultation with the ASRSC, USF&WS, PIN, and local salmon clubs, monitor the effectiveness and permanence of the salmon lies created as required by this condition.

D. The applicant shall, prior to creation of salmon lies, submit a plan to monitor the effectiveness and permanence of the lies. This plan shall be prepared in consultation with the ASRSC, USF&WS, PIN, and local salmon clubs, and must be reviewed and approved by the DEP Bureau of Land Quality Control.

E. The applicant shall submit a report on the effectiveness and permanence of all artificial salmon lies, along with any recommendations for additional actions to maintain fishing opportunity, to the DEP and all consulting agencies and fishing clubs. This report shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. The Department reserves the right, after notice and opportunity for hearing, and after reviewing the comments of all consulting agencies and fishing clubs, to require additional actions as are deemed necessary to fully mitigate for project impacts on salmon angling opportunity.

16. VEAZIE DESIGN AND OPERATION

A. The applicant shall conduct a hydraulic modeling study and shall design and construct the Veazie Plant C tailrace to minimize the effect of Plant C discharges on existing angling opportunity.

B. The applicant shall submit the results of the modeling and design plans for the Plant C tailrace as required by Part A of this condition. The modeling shall be conducted and the design plans prepared in consultation with the U.S. Fish & Wildlife Service,

and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to Plant C construction.

C. The Veazie Development shall be operated to maximize salmon angling below the Veazie Dam without unacceptably impairing fish passage at the site.

D. The applicant shall submit a plan to operate the Veazie Development as required by Part C of this condition. This plan shall be prepared in consultation with the Atlantic Sea Run Salmon Commission, the Department of Marine Resources, and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to Plant C operation.

17. WETLANDS MITIGATION

A. The applicant shall restore, preserve, enhance and create wetlands as proposed and described in Section 21 of this approval to fully compensate for the loss of wetland functions and values due to the project.

B. The applicant shall submit a plan to mitigate for wetlands impacts as required by Part A of this condition. This plan shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. This plan must be in conformance with the requirements of DEP's Chapter 310 Wetland Protection Rules and shall include provisions to monitor and report on the success of all wetland mitigation measures, and to take all remedial actions necessary to fully compensate for lost wetland functions and values. This plan shall be prepared in consultation with the DEP Division of Natural Resources, the U.S. Fish & Wildlife Service and the U.S. Army Corps of Engineers, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to its implementation.

18. GROUNDWATER CONTROL

A. The applicant shall prepare and implement a final groundwater control program to fully mitigate groundwater impacts of the Basin Mills Dam.

B. The applicant shall submit a final groundwater control program. This program shall be filed prior to filling the Basin Mills impoundment. This program shall include provisions to monitor and maintain all groundwater control measures over the life of the project. This program shall be prepared in consultation with the DEP Bureau of Water Quality Control and the affected municipalities, and must be reviewed and approved by the DEP Bureau of Land Quality Control its implementation.

19. ARCHAEOLOGICAL MITIGATION

The applicant shall implement the archaeological mitigation plan proposed, as described in Section 24 of this order. All archaeological mitigation activities shall be undertaken to the satisfaction of the Maine Historic Preservation Officer.

20. FLOOD CONTROL

A. The applicant shall implement all flood control measures as proposed and as described in Section 25 of this order.

B. The applicant shall prepare and submit for approval by the Federal Emergency Management Agency revised flood profiles and floodplain maps for the Penobscot River from the Veazie Dam to the Great Works Dam, based on final project design. The applicant shall submit a copy of the required FEMA approvals to the DEP Bureau of Land Quality Control.

21. DISSOLVED OXYGEN MONITORING

A. The applicant shall monitor dissolved oxygen levels at the Orono municipal wastewater treatment plant outfall and shall take all remedial actions necessary to maintain Class B DO levels in the outfall area.

B. The applicant shall submit a plan to monitor and take remedial actions to maintain DO levels as required by Part A of this condition. This plan shall be submitted prior to the commencement of project construction. This plan shall be prepared in consultation with the DEP Bureau of Water Quality Control, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of Basin Mills construction.

22. EROSION AND SEDIMENTATION CONTROL

A. The applicant shall take all measures proposed, and any other measures necessary, to minimize erosion and sedimentation during and following the approved construction activity.

B. The applicant shall hold a pre-construction conference with the DEP, the project consulting engineer, the project general contractor, and any appropriate project sub-contractors to review site-specific erosion and sedimentation control plans.

C. Cofferdam fill placed in a waterway or within the 10-year floodway boundaries of a waterway shall consist of gravel, rock or sand of hard durable particles free from vegetative matter, lumps or balls of clay, and other deleterious substances. That portion passing a 3-inch (No. 200) sieve shall not exceed 10% fines. Those portions of a cofferdam or access road in contact with moving water shall be protected by filter fabric and/or riprap.

D. The applicant shall prepare and implement site-specific plans for the off-site disposal and stabilization of all excess excavation spoils. These plans shall be in conformance with the Maine Solid Waste Management Rules, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to spoils disposal at any off-site location.

23. RESERVOIR CLEARING

The applicant shall, prior to filling the Basin Mills impoundment, clear all trees and brush up to elevation 66 feet MSL along those

steep bank areas of the new impoundment which could experience bank failure.

24. STRIAR MILL PROCESS WATER

The applicant shall install and maintain a temporary process water intake and pipeline to provide clean process water on a continual basis to the Striar Mill during the construction of the Basin Mills Dam.

25. WATER TEMPERATURE STUDY

A. The applicant shall, in consultation with the Atlantic Sea Run Salmon Commission, the DEP Bureau of Water Quality Control, and the Penobscot Indian Nation, conduct a post-construction study to determine the effects of ambient water temperatures in the lower Penobscot River on migrating Atlantic salmon.

B. The applicant shall submit a plan to study water temperatures as required by Part A of this condition. This plan shall be submitted prior to the commencement of project operation or upon such schedule as may be established by FERC. This plan shall include provisions to monitor water temperatures and salmon behavior in the river from the West Enfield Dam to the Bangor Dam site. This plan shall be prepared in consultation with the ASRSC, DEP Water Bureau, and the Penobscot Indian Nation, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of Basin Mills operation.

C. The applicant shall submit the results of the temperature study required by this condition, along with any recommendations for project modifications or other remedial measures, to the DEP and all consulting agencies. These results shall be submitted following a schedule agreed to by the DEP or as may be established by FERC. The Department reserves the right, after notice and opportunity for hearing, and after reviewing the comments of all consulting agencies, to require such changes in project facilities and operation and/or such other mitigation measures as are deemed appropriate and necessary to reduce the effects of ambient water temperatures on migrating salmon.

26. CONCRETE LIMITATIONS

With the exception of limited amounts of concrete used where necessary to seal the interface between steel cofferdams and the underlying bedrock surface, uncured concrete shall not be placed in direct contact with surface waters. Concrete shall be precast and cured at least three weeks before being placed in the water, or where necessary, shall be placed in forms and shall cure at least one week prior to form removal. No washing of tools, forms, etc. shall occur in or adjacent to any waterway or wetland.

27. HOWLAND DAM REMOVAL

A. The applicant shall, in consultation with the Town of Howland, the Penobscot Indian Nation, and all appropriate state and federal agencies, conduct all necessary studies to evaluate the economic,

environmental and social costs and benefits of removing the Howland Dam.

B. The applicant shall submit a plan and schedule to study the costs and benefits of removing the Howland Dam as required by Part A of this condition. These filings shall be submitted within one year of this approval. These filings shall be prepared in consultation with the Town of Howland, the Penobscot Indian Nation, and all appropriate state and federal agencies, and must be reviewed and approved by the DEP Bureau of Land Quality Control prior to commencement of the studies.

C. The applicant shall submit the results of the Howland Dam removal studies required by Part A of this condition, along with a completed application for a Maine Waterway Development and Conservation Act Permit and Water Quality Certification to remove the dam, to the DEP and all consulting parties no later than September 30, 1998.

D. If the Board finds, after notice and opportunity for hearing, and after reviewing the results of the dam removal studies and the comments of all consulting parties, that the removal of the Howland Dam is in the public interest and satisfies all applicable statutory criteria, then the applicant shall, upon such schedule as agreed to by the Board, prepare all necessary applications and diligently pursue all necessary regulatory approvals for the removal of the dam. If all necessary regulatory approvals are received, the applicant shall expeditiously undertake the removal of the dam in compliance with all applicable regulatory requirements.

28. EFFECTIVE DATE

This permit and certification shall be effective on the date of issuance of a new hydropower project license by the Federal Energy Regulatory Commission, and shall expire with the expiration of this FERC license.

DONE AND DATED AT AUGUSTA, MAINE, THIS 10th DAY OF November, 1993.

BOARD OF ENVIRONMENTAL PROTECTION

BY: _____
Owen R. Stevens, Chairman

Date of initial receipt of application: 7/20/90 .
Date of application completion: 4/6/92 .
Date of last application withdrawal & refiling: 3/24/93 .

Date filed with the Board:

FILED
NOV 10 1993
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

STANDARD CONDITIONS OF APPROVAL--HYDROPOWER PROJECTS

THE FOLLOWING STANDARD CONDITIONS OF APPROVAL SHALL APPLY TO ALL HYDROPOWER PROJECT PERMITS GRANTED UNDER THE MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT, TITLE 38, MRSA, SECTION 630 ET SEQ , UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

1. Limits of Approval. This approval is limited to and includes the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. All variances from the plans and proposals contained in said documents are subject to the review and approval of DEP or LURC (as appropriate) prior to implementation.

2. Noncompliance. Should the project be found, at any time, not to be in compliance with any of the conditions of this approval, or should the permittee construct or operate this project in any way other than specified in the application or supporting documents, as modified by the conditions of this approval, then the terms of this approval shall be considered to have been violated.

3. Compliance With All Applicable Laws. The permittee shall secure and appropriately comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation.

4. Inspection and Compliance. Authorized respresentatives of the DEP, LURC or the Attorney General shall be granted access to the premises of the permittee at any reasonable time for the purpose of inspecting the construction or operation of the project and assuring compliance by the permittee with the conditions of this approval.

5. Initiation and Completion of Construction. If construction is not commenced within 3 years and completed within 7 years frorm the date of issuance of this permit, this approval shall lapse, unless a request for an extension of these deadlines has been approved by the DEP or LURC (as appropriate).

6. Construction Schedule. Prior to construction, the permittee shall submit a final construction schedule for the project to the DEP or LURC (as appropriate).

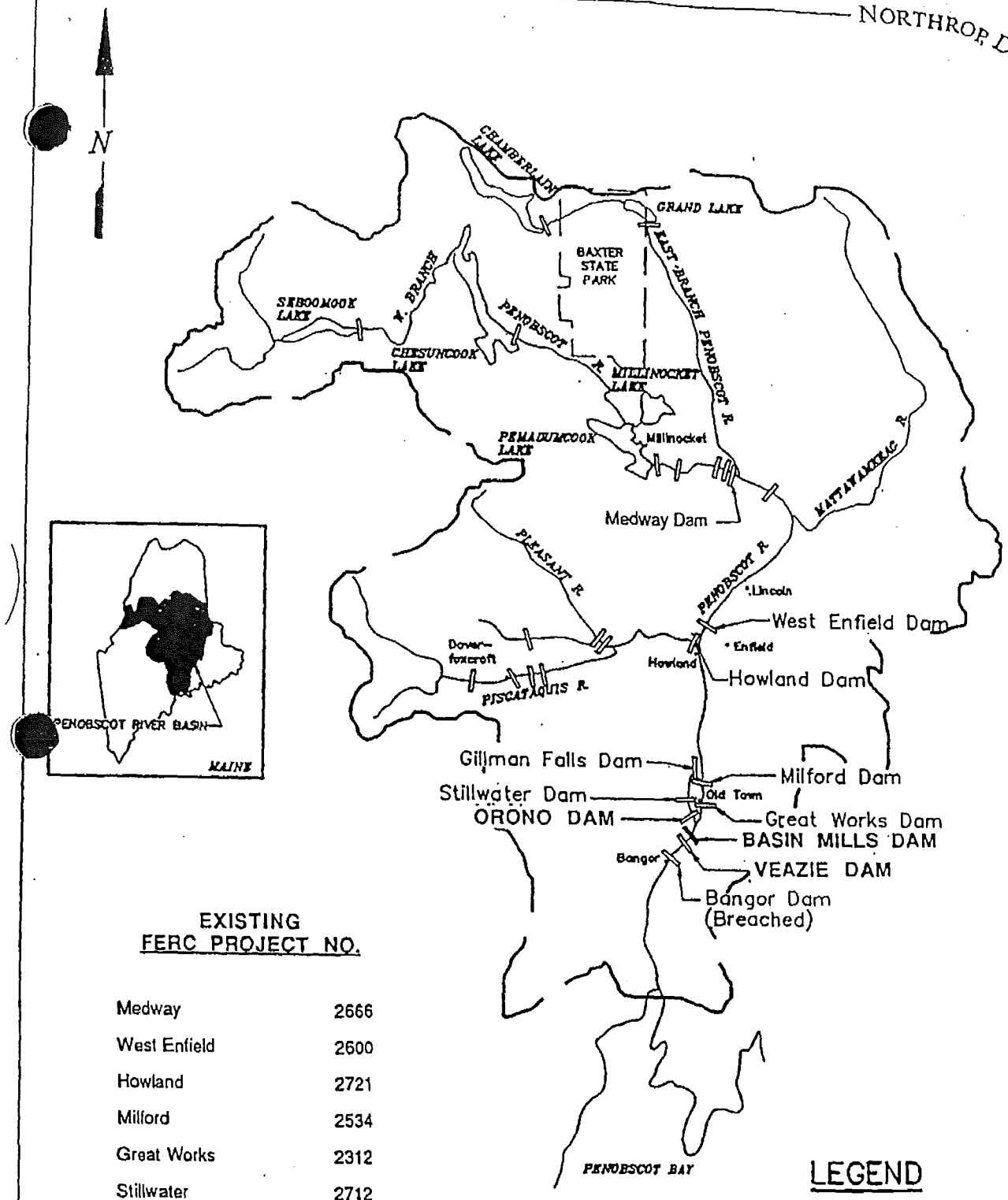
7. Approval Included in Contract Bids. A copy of this approval must be included in or attached to contract bid specifications for the project.

8. Approval Shown to Contractor. Work done by a contractor pursuant to this approval shall not begin before a copy of this approval has been shown to the contractor by the permittee.

9. Notification of Project Operation. The permittee shall notify the DEP or LURC (as appropriate) of the commencmcnt of commercial operation of the project within 10 days prior to such commencement.

10. Assignment or Transfer of Approval. This approval shall expire upon the assignment or transfer of the property covered by this approval unless written consent to transfer this approval is obtained from DEP or LURC (as appropriate). A 'transfer' is defined as the sale or lease of property which is the subject of this approval, or the sale of 50% or more of the stock of or interest in a corporation or a change in the general partner of a partnership which owns the property subject to this approval.

NORTHROP DEVINE & TARBELL, INC.



EXISTING
FERC PROJECT NO.

Medway	2666
West Enfield	2600
Howland	2721
Milford	2534
Great Works	2312
Stillwater	2712
Orono	2710
Veazie	2403

BASIN MILLS PROJECT

BASIN MILLS	(PROPOSED DEVELOPMENT)
ORONO	(EXISTING DEVELOPMENT)
VEAZIE	(EXISTING DEVELOPMENT)

Exhibit 1

FIGURE 1
PENOBSCOT RIVER BASIN

Exhibit 2

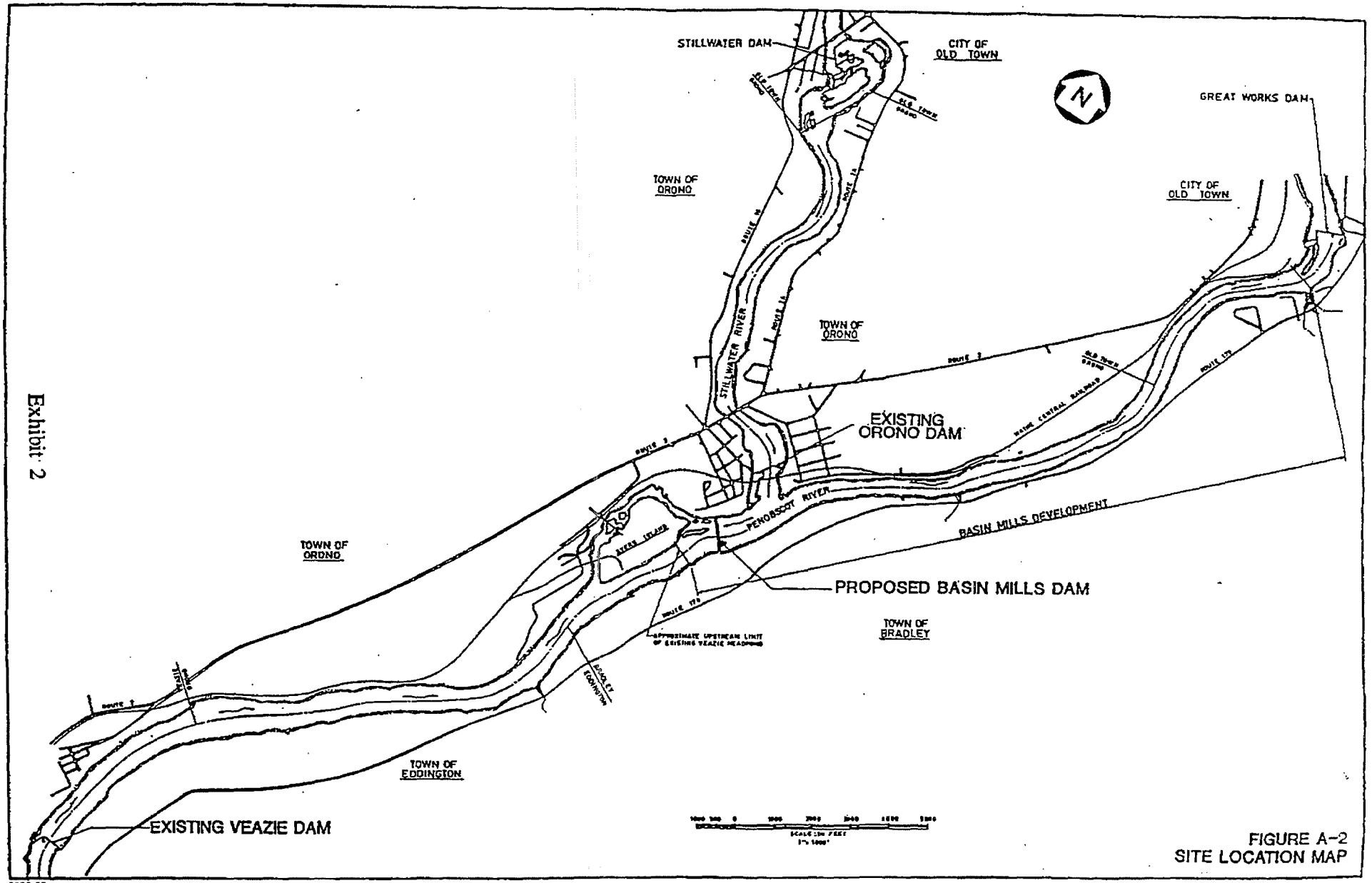


FIGURE A-2
SITE LOCATION MAP

5279-09

Exhibit 3

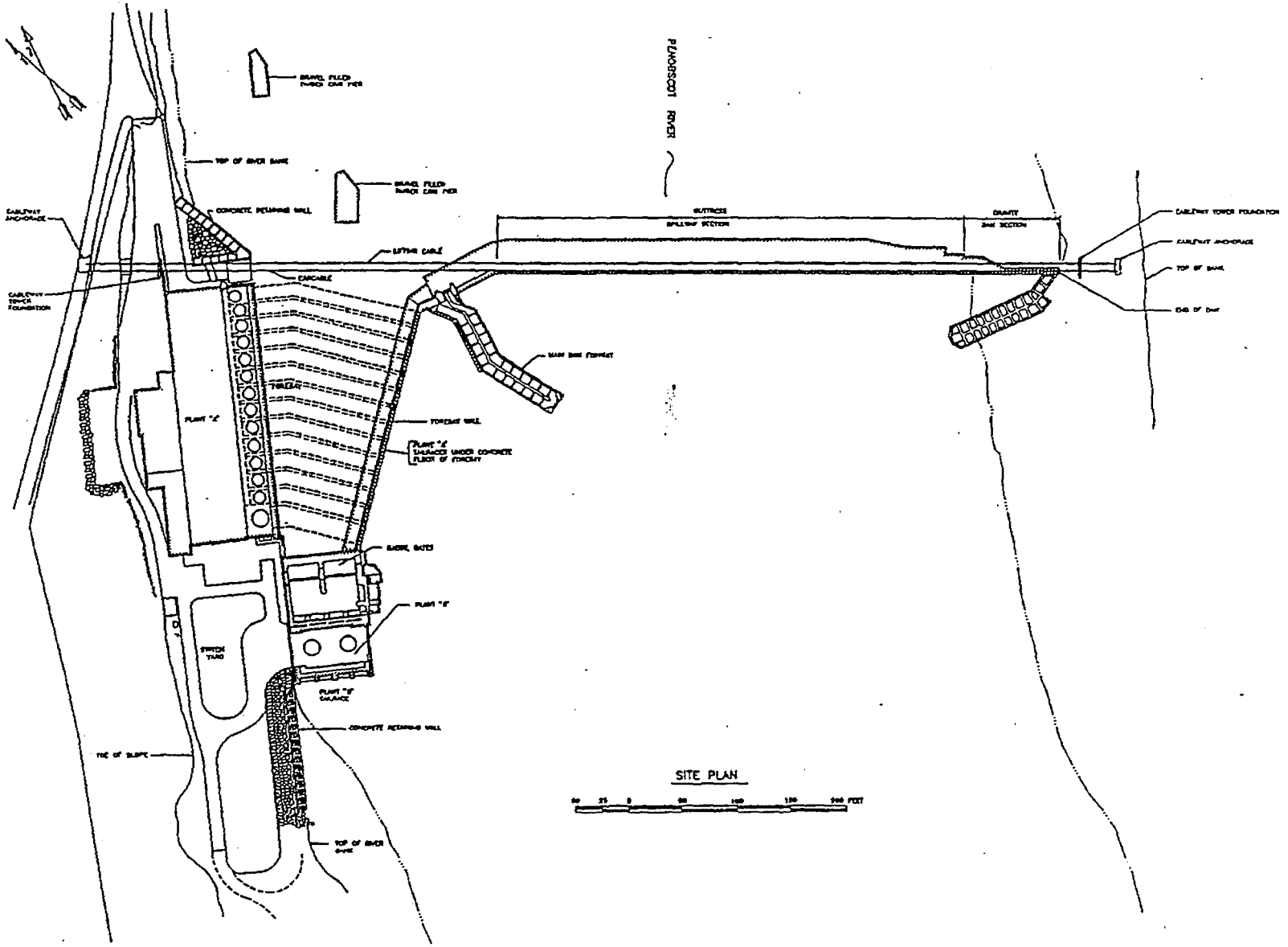


FIGURE 2
EXISTING SITE PLAN
VEAZIE DEVELOPMENT

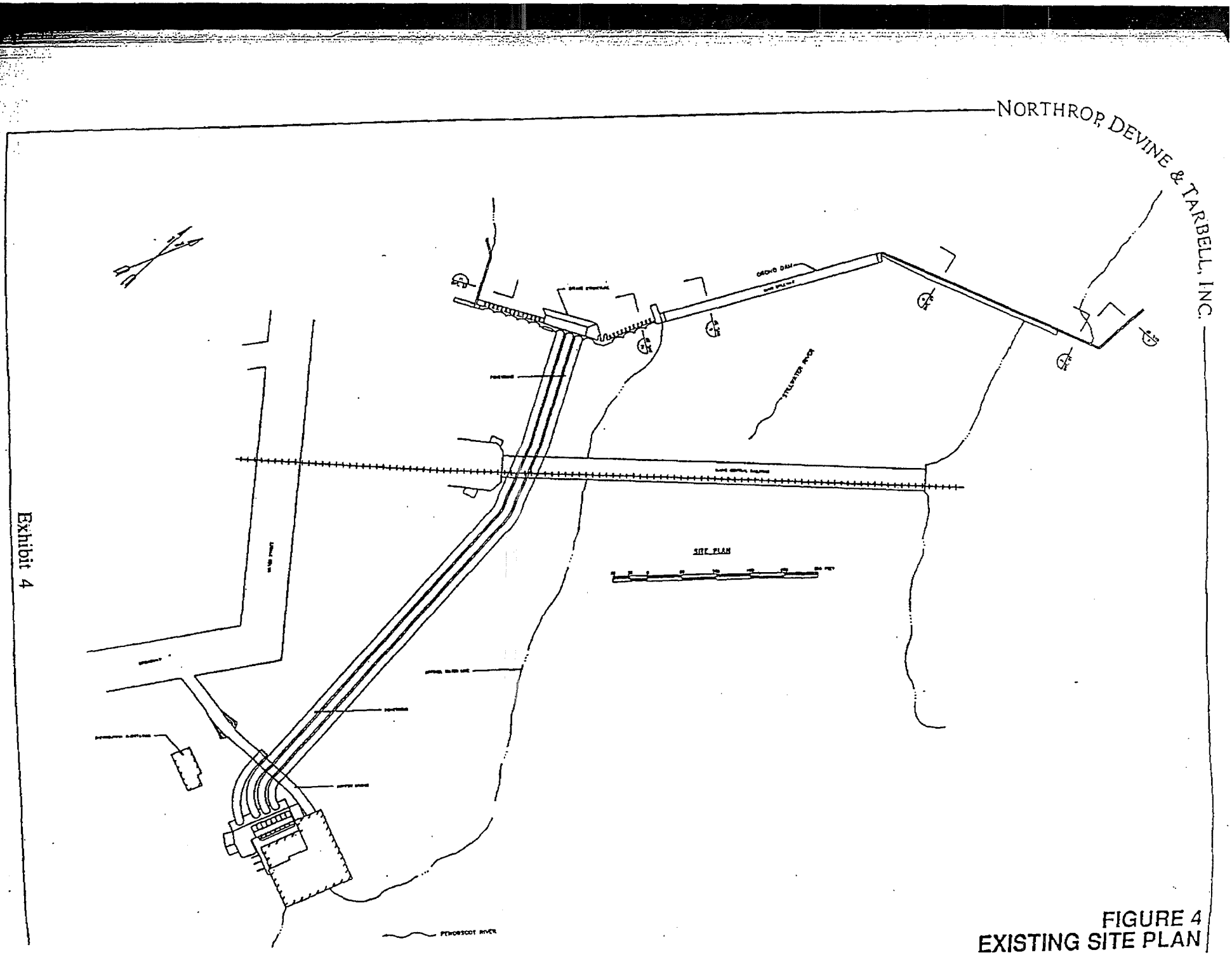
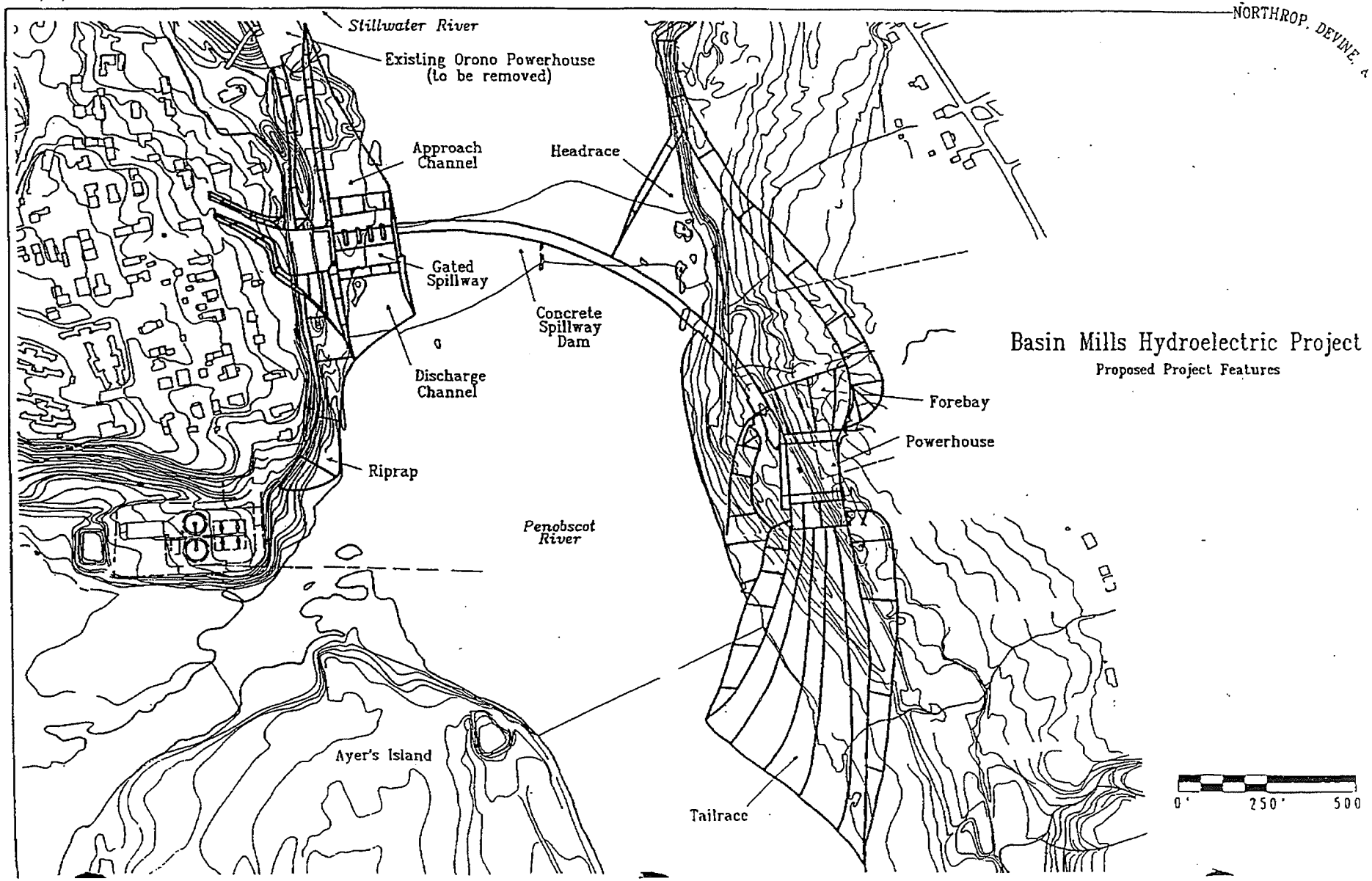


FIGURE 4
EXISTING SITE PLAN

Exhibit 6


NORTHROP, DEVINE, &
Stillwater River
Existing Orono Powerhouse
(to be removed)
Approach
Channel
Headrace
Gated
Spillway
Concrete
Spillway
Dam
Discharge
Channel
Riprap
Penobscot
River
Ayer's Island
Tailrace
Forebay
Powerhouse
Basin Mills Hydroelectric Project
Proposed Project Features
0'
250'
500