

**Review of the West Springfield Hydroelectric Project's
Application for
LIHI Low Impact Hydropower Certification
Prepared by Fred Ayer, LIHI**

Introduction and Overview

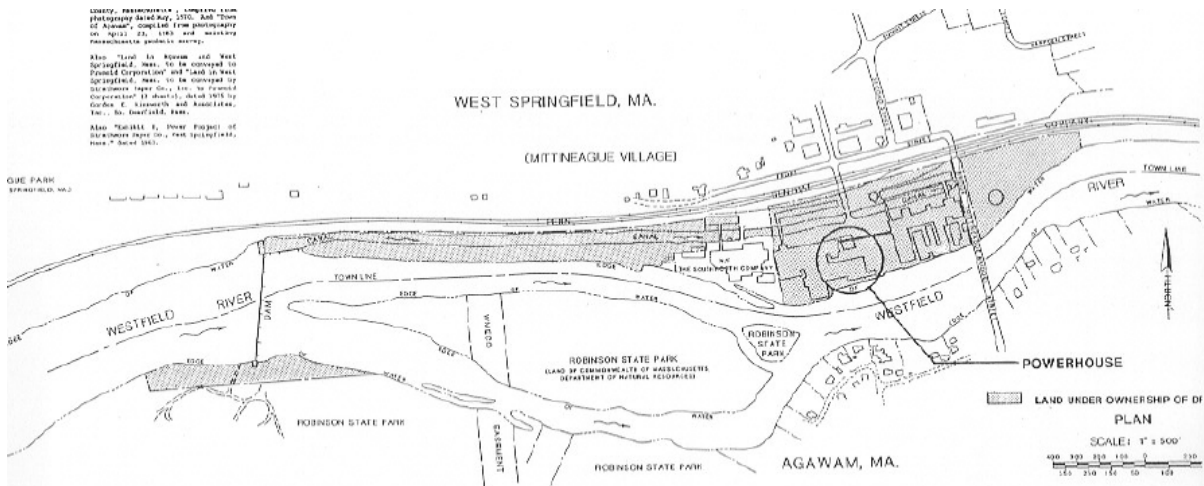
This report reviews the application submitted by A & D Hydro, Inc. (applicant) to the Low Impact Hydropower Institute (LIHI) for Low Impact Hydropower Certification for the West Springfield Project (project or facility) on the Westfield River West Springfield and Agawam, Massachusetts.

The Federal Energy Regulatory Commission (FERC) issued a license in October, 1994 to the then Licensee, Decorative Specialties International, Inc. (DSI or applicant), for the continued operation and maintenance of the 1.4-megawatt (MW) West Springfield Hydroelectric Project FERC No. 2608. The current Licensee and applicant for certification, A & D Hydro, Inc., acquired the project on July 20, 2004. The Project is located on the Westfield River in the towns of West Springfield and Agawam, in Hampden County, Massachusetts. The Federal Power Commission issued the original license for the project to the Hammermill Paper Company in 1968.

Notice of the application was published on February 23, 1993. Five parties filed timely motions to intervene in this proceeding: the U.S. Department of the Interior (Interior), Pioneer Valley Planning Commission (PVPC), the Westfield River Watershed Association (WRWA), the Commonwealth of Massachusetts (Massachusetts), and a joint motion filed by Trout Unlimited et al. (TU). Most of the motions to intervene were unopposed and therefore granted automatically.

TU filed a Motion to Intervene in Opposition to the project on April 26, 1993. TU later filed a motion to conditionally withdraw its opposition to the licensing of the West Springfield Hydroelectric Project based on the understanding that (1) this license would include the terms of a Memorandum of Agreement (MOA) between the applicant, the Massachusetts Division of Fisheries and Wildlife (MDFW), and the U.S. Fish and Wildlife Service (FWS) regarding fish passage facilities and protection of aquatic resources; and (2) the Commission would issue a final National Environmental Policy Act (NEPA) document that does not substantively differ from the draft NEPA document.

Project and site characteristics. The West Springfield Project is located in the Connecticut River Basin. The Connecticut River is the largest river in New England. It extends about 400 miles from its origin in Fourth Connecticut Lake, New Hampshire, at an elevation of 2,625 feet, to Saybrook, Connecticut, where it empties into Long Island Sound. The tidal portion of the river extends from Long Island Sound to a point 60 miles upstream (Enfield Rapids). The Connecticut River is a highly developed resource with many



projects in the smaller tributaries of northern Massachusetts, Vermont, and New Hampshire. At present, there are 109 existing hydroelectric developments in the Connecticut River Basin. Because of their upstream location and remoteness, however, these projects have no effect on the West Springfield Project.

The Westfield River is a major tributary of the Connecticut River. The Westfield and Connecticut Rivers confluence is about 7 miles north of the Massachusetts/Connecticut border. Ground elevation at the confluence of the Westfield and Connecticut Rivers is about 48 feet msl.

The West Springfield Project consists of : an 18-foot-high, 447.5-foot-long timber crib dam with a dam crest elevation of 92.80 feet above mean sea level (msl) that creates a 20-acre impoundment; a 2,610-foot-long, 50-foot-wide power canal with concrete headworks containing six gates; a concrete and brick powerhouse about 60 feet long, 54 feet wide, and 63 feet high containing two vertical Francis turbines connected to two 480-volt generators; and a tailrace approximately 157 feet in length and having a width varying from 30 to 48 feet. Unit One is rated at 900 kilowatts (kW) and Unit Two is rated at 466 kW. However, due to flow restriction in the power canal, the combined capacity is 1,200 kW (Unit One at 800 kW and Unit Two at 400 kW). The project's average annual generation is 5.5 gigawatt-hours (GWh).

There are no primary transmission lines included in the project.

The project currently operates as a run-of-river facility (inflow equals outflow instantaneously). The hydraulic capacity of the project is 622 cubic feet per second (cfs) (400 cfs for Unit One and 222 cfs for Unit Two). The adjacent Southworth Company also draws water from the power canal to operate their own generating facility. When the facility is not operating and inflows are below the hydraulic capacity of the turbines used by the Southworth Company, all inflow is spilled at the dam.

Public comment. LIHI received no public comments.

General conclusions. This project is easily found to be consistent with LIHI criteria in all areas. The West Springfield Hydroelectric Project's FERC license conditions, with only a few exceptions, are based on the Memorandum of Agreement (MOA) between the applicant, the Massachusetts Division of Fisheries and Wildlife (MDFW), and the U.S. Fish and Wildlife Service (FWS) regarding fish passage facilities and protection of aquatic resources through minimum flows. The §401 Water Quality Certificate was deemed waived by FERC after the MDEP did not act on it in a timely fashion. However, MDEP believes that all of the conditions that would have appeared in a Water Quality Certificate are included in the MOA which is part of the FERC license for this project.

Dealing with these types of issues through a settlement agreement resolves what has traditionally been the stuff that makes Relicensing difficult and time consuming for applicants as well as resource agencies and delays implementation of needed mitigative measures.

Recommendation. Based on my review of information submitted by the applicant, my review of additional documentation, and my consultations with resource agency staff, I believe the West Springfield Hydroelectric Project meets all of the criteria to be certified and I recommend certification. However, because of issues concerning the effectiveness of the fish passage facilities, I recommend the Board condition the certification on the applicant and state and federal fishery agencies arriving at a solution for the three issues identified in the November 15, 2005 letter (see Attachment A) from Caleb Slater, Anadromous Fish Project Leader Massachusetts Division of Fisheries and Wildlife by December 31, 2006.

Low Impact Certification Criteria

A. *Flows*

- 1) **Is the Facility in *Compliance with Resource Agency Recommendations* issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?**

YES

The Memorandum of Agreement (MOA) requires the licensee to provide sufficient flows and modify the channel to achieve an adequate zone of passage (ZOP) between the project tailrace and the upstream and downstream fishways. Spill over the dam is critical because fish need the proper flow of water in the bypass reach (the section between the dam and the powerhouse that is “bypassed” by the power canal) in order to reach the fishway. The fishway itself also needs proper flow, both in the fishway and through the attraction water gate, to function efficiently.

The final Fish Passage Operation and Maintenance Plan was issued on January 22, 2001. It defines the minimum flows that the project must maintain:

- Bypass reach habitat minimum flow of 85 cubic feet per second (cfs) or inflow.
- Zone of passage minimum flow of 125 cfs or inflow during upstream fish passage seasons (April 1 – July 15 and September 1 – October 31).

Flow is directed into the bypass through the following devices:

- 1) Three 3 foot wide and 2 foot deep slots in the dam adjacent to the head gate.
Hydraulic capacity of each slot: 25 cfs full open, 9 cfs half-open.
- 2) Downstream (DS) fish bypass system. Hydraulic capacity: 25 cfs.
- 3) Denil fishway. Hydraulic capacity: 40 cfs (15 cfs in fishway, 25 cfs attraction water system).

The following flows are required:

<u>Time of Year</u>	<u>Flow Needed</u>	<u>Devices in Operation</u>
April 1 – July 15	125 cfs	2 slots full open, 1 slot ½ open, Denil fishway, DS fish bypass
July 16 – August 31	85 cfs	2 slots full open, 1 slot ½ open, DS fish bypass
Sept 1 – Oct 31	125 cfs	2 slots full open, 1 slot ½ open, Denil fishway, DS fish bypass
Nov 1 – March 31	85 cfs	3 slots full open (DS fishway may be required through Dec 31)

YES = Go to B

PASS

B. Water Quality

1) Is the Facility either:

a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986?

Or

b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?

YES

On December 20, 1991, the applicant applied to the Massachusetts Department of Environmental Protection (MDEP) for Section 401 Water Quality Certification (WQC), as required by the Clean Water Act. By letter dated December 2, 1992, the applicant withdrew its initial request and refiled a new request for WQC. MDEP acknowledged receipt of the new WQC request on December 8, 1992, but did not act on it.

Based on § 4.38(f)(7)(ii) of the FERC's regulations agencies must act on a pending §401 WQC request within 1 year from the date of receipt of the application, or the certification is deemed waived. Since MDEP did not act on applicant's request within 1 year, the certification was deemed to be waived.

In a response to a request from LIHI staff concerning the absence of a §401 WQC for the West Springfield Project, the MDEP in an August 12, 2005 letter said:

“ In the opinion of this agency and our sister agency, the Massachusetts Division of Fisheries and Wildlife, that all of the conditions that would have appeared in a Water Quality Certificate are part of the FERC license for this project. We believe those conditions are protective of aquatic resources and meet water quality standards.”

If YES, go to B2.

2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?

NO

If NO, go to C.

PASS

C. Fish Passage and Protection

- 1) Is the Facility in Compliance with *Mandatory Fish Passage Prescriptions* for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?**

YES

Interior filed measures pursuant to Section 18 by letter dated April 21, 1993. Subsequently, FWS became a party to the MOA (dated February 2, 1994) with the applicant and MDFW. As a result of the MOA, Interior filed a revised Section 18 prescription by letter dated February 22, 1994.

The Denil-type Fishway was built in 1995, as a result of the Federal Energy Regulatory Commission (FERC) relicensing process, and first operated in 1996. Since then, migratory fish (including anadromous species such as Atlantic salmon, American shad, sea lamprey, and blueback herring) have used this facility to move upstream where they can find suitable habitat to help complete their life cycle. Prior to construction of the fishway, the Project dam was the first barrier fish encountered on their way up the Westfield River.

The FERC agreement clearly spells out responsibilities of the applicant and the government (MA Division of Fisheries and Wildlife). In the summer of 2001, an eelway was constructed at the fishway, allowing the catadromous fish, American eel, to migrate upstream to its natural habitat. There are plans to continue to manage for these species and other migratory fish in the Westfield River. Passage of fish at the Project opens up approximately 20 additional miles of habitat in the mainstem Westfield and much more in the tributaries.

- 5) Is the Facility in Compliance with *Mandatory Fish Passage Prescriptions* for upstream and/or downstream passage of *Riverine* fish?**

YES

- 6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?**

YES

PASS

D. Watershed Protection

4. Is the Facility in Compliance with Resource Agency Recommendations, or, if none, with license conditions, regarding protection, mitigation or enhancement of lands inundated by the Facility or otherwise occupied by the Facility, and regarding other watershed protection, mitigation and enhancement activities?

YES

Watershed enhancements from the FERC license include:

- (1) a parking area for 20 vehicles;
- (2) signs to inform the public of access opportunities;
- (3) a surfaced and graded trail from the parking area to the river that meets disabled access Challenge Level 2 specifications;
- (4) a canoe launch and fishing access site; and
- (5) a plan for controlling river bank slumping and erosion that could result from the construction and operation of these facilities.

PASS

E. Threatened and Endangered Species Protection

1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?

YES

If YES, go to E2.

2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?

NOT APPLICABLE

If NOT APPLICABLE, go to E3.

3) If the Facility has received authority to incidentally *Take* a listed species

through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?

NOT APPLICABLE

If NOT APPLICABLE, go to E5.

5) If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?

YES

The USFWS in correspondence dated September 26, 2005 to the applicant stated: “Except for wintering bald eagles (*Haliaeetus leucocephalus*), no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the USFWS are known to occur in the project area.”

If YES, go to F.

PASS

F. Cultural Resource Protection

1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?

YES

The Massachusetts Historical Commission in correspondence dated August 17, 1989 to the applicant’s consultant stated: “After review of MHC files and materials you submitted, it has been determined that this project is unlikely to affect significant historic or archaeological resources. No further review is required in compliance with §106 of the National Historic Preservation Act...”

If YES, go to G.

PASS

G. Recreation

- 1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?**

YES

The recreation enhancements required by the FERC license include the following facilities located on applicants property on the north bank of the Westfield River downstream of the Mittineague Bridge: (1) a parking area for 20 vehicles; (2) signs to inform the public of access opportunities; (3) a surfaced and graded trail from the parking area to the river that meets disabled access Challenge Level 2 specifications; and (4) a canoe launch and fishing access site;

If YES, go to G3.

- 2) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?**

YES

The facility, which is in an urban area, does not restrict public access to upstream or downstream areas.

If YES, go to H.

PASS

H. Facilities Recommended for Removal

- 1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?**

NO

If NO, facility is low impact.

PASS.

FACILITY IS LOW IMPACT

RECORD OF CONTACTS

Date of Conversation: July –September 2005
Application Reviewer: Fred Ayer, Executive Director
Person Contacted: Tom Tarpey, Essex Hydro Associates
Telephone/email: (617) 367-0032
Areas of Expertise: Applicant

In a series of phone conversations with Tom Tarpey, I was able to get additional information and clarifications on several subjects including: fish passage construction, use, and operating responsibilities; Waiver of the §401 WQC; details of implementation of the MOA; and, watershed activities.

Tom has been extremely helpful in gathering archive information on a ten year old licensing proceeding (1994) and at the same time getting updated information and written confirmation on critical issues.

Date of Conversation: July-August 2005
Application Reviewer: Fred Ayer, Executive Director
Person Contacted: Bob Kubit, Mass DEP
Telephone/email: 508-767-2854
Areas of Expertise: § 401 WQC

I spoke with Bob on several occasions concerning FERC's waiving of the §401 WQC. The §401 Water Quality Certificate was deemed waived by FERC after the MDEP did not act on it in a timely fashion. Bob confirmed that the description of the waiver was accurate. He said, however, that he believes that all of the conditions that would have appeared in a Water Quality Certificate are included in the MOA which is part of the FERC license for this project. After some discussion, Bob said he would meet with Caleb Slater MADFW, and if he agrees, he will send a letter that captures what he said about the MOA. We received the letter on August 15, 2005.

Date of Conversation: July-August, 2005
Application Reviewer: Fred Ayer, Executive Director
Person Contacted: Caleb Slater, Mass Wildlife
Telephone/email: 508-792-7270, ext. 133
Areas of Expertise: Fish biology, Anadromous and Catadromous fish passage

I had several discussions with Caleb during the height of his very busy field season. He indicated a positive working relationship with the project owners and managers. He said that they were an improvement and he hoped for some stability as the site had changed hands. He confirmed the WQC issue and agreed with Bob Kubik's thoughts on the MOA.

Date of Conversation: November 15, 2005
Application Reviewer: Fred Ayer, Executive Director
Person Contacted: John Warner, USFWS
Telephone/email: 603-223-2541
Areas of Expertise: Fish aquatic ecology

I spoke with John about the project and he told me that there were several, as yet unresolved issues. He gave me a brief overview, but said that Caleb Slater was writing a letter which would describe the issues in more detail. He suggested that Caleb was writing the letter "as we spoke." John also confirmed other suggestions that the Licensee had been good to work with and thought that these issues were all resolvable. During my call with John, I received a call from and phone message from Caleb. .

Date of Conversation: November 15, 2005
Application Reviewer: Fred Ayer, Executive Director
Person Contacted: Caleb Slater, Mass Wildlife
Telephone/email: 508-792-7270, ext. 133
Areas of Expertise: Fish biology, Anadromous and Catadromous fish passage

I called Caleb back after I got off the phone with John Warner. Caleb let me know that he was finishing the letter and I would get it later in the day. But he summarized what was in the letter:

In general the project is well run and they have had no violations of license articles (minimum flow or fish passage) since the applicant bought the project. The owners have always been receptive to the Division's recommendations.

The applicant has several modifications, such as replacing the physical barrier at the tailrace with an electric barrier, which will be beneficial to both fish and power production.

This being said, there remain several issues still outstanding:

- **Zone Of Passage (ZOP) modifications at the tailrace.** Concrete Jersey barriers were placed in this area in order to direct flow toward the project tailrace and create an attractive flow in the upstream ZOP. High flows knocked one of these barriers over and moved another. Sandbags and rock debris have been placed in line with the remaining (but toppled) Jersey barrier in order to create the desired flow pattern. This arrangement has been somewhat effective, but requires rebuilding each spring. We believe that some permanent solution to the flow field problems at this site should be implemented. The project owners have agreed, but there is no timetable for the design and implementation of a solution at present.

- **Entrainment of Atlantic salmon smolt in the power canal.** During the 2005 fish passage season a significant number of Atlantic salmon smolt were seen in the project forebay. When asked, the applicant shut the project down for a day and drained the power canal- this seemed to flush the smolt from the canal. Possible causes for this increased entrainment include the reduced operation time of the automated trash rack rakes at the head of the power canal, or the reorientation of the trash boom at the headgate. We have suggested replacing the plastic racks with normal steel racks.

The applicant agreed to reconfigure the trash boom in a manner which should leave the area near the fish passage slots clear. We will evaluate this change during the 2006 fish passage season. Additional changes may be required if the smolt entrainment issue is not resolved in 2006.

I have attached the November 15th letter to this report and it includes a more detail description of the issues, what has been done, and what needs to be done.

Attachment A

November 15, 2005 letter

from

Caleb Slater, Anadromous Fish Project Leader
Massachusetts Division of Fisheries and Wildlife

Nov 15, 2005

Fred Ayer
Low Impact Hydropower Institute
info@lowimpacthydro.org
RE: West Springfield Hydroelectric Project

Fred Ayer,

The Massachusetts Division of Fisheries and Wildlife (Division) is the agency responsible for the protection and management of the fish and wildlife resources of the Commonwealth. As such we monitor operations at hydroelectric projects within the Commonwealth. The Division has the following comments on the proposed Low Impact Hydropower Certification of the A&D Hydro Project (FERC No. 2608) located on the Westfield River in West Springfield, MA.

In general the project is well run. We have had no violations of license articles (minimum flow or fish passage) since A&D bought the project and the owners have always been receptive to the Division's recommendations. A&D has proposed several modifications, such as replacing the physical barrier at the tailrace with an electric barrier, which will be beneficial to both fish and power production.

This said there are several issues still outstanding:

- Zone Of Passage (ZOP) modifications at the tailrace. This has been an area of concern since the fishway was first operated in 1996. Concrete Jersey barriers were placed in this area in order to direct flow toward the project tailrace and create an attractive flow in the upstream ZOP. High flows after installation knocked one of these barriers over and moved another. Sandbags and rock debris have been placed in line with the remaining (but toppled) Jersey barrier in order to create the desired flow pattern. This arrangement has been somewhat effective, but requires rebuilding each spring. We believe that some permanent solution to the flow field problems at this site should be implemented. The project owners have agreed, but there is no timetable for the design and implementation of a solution at present.
- Entrainment of Atlantic salmon smolt in the power canal. During the 2005 fish passage season a significant number of Atlantic salmon smolt were seen in the project forebay. When asked, A&D agreed to shut the project down for a day and drain the power canal- this seemed to flush the smolt from the canal. Possible causes for this increased entrainment include the reduced operation time of the automated trash rack rakes at the head of the power canal, or the reorientation of the trash boom at the headgate. Under previous ownership the automatic rakes operated continuously, A&D have modified them to part time operation. These racks also serve as fish exclusion structures and the noise/motion of the automatic rakes may have helped keep smolt away from the racks. These racks are plastic and somewhat flexible- it is possible that holes or wide gaps have formed in these racks that are allowing the

smolt to enter the power canal. We have suggested replacing the plastic racks with normal steel racks.

Before the 2005 fish passage season A&D moved the anchor location of the trash boom from the outboard corner of the headgate structure to the center of the minimum flow/downstream fish passage slots (approximately 25 feet further out on the dam). This configuration guided leaves and debris to the outermost slot for efficient passage over the dam. Unfortunately this configuration may have discouraged smolt from approaching the slots and directed them instead to the power canal. A&D have agreed to reconfigure the trash boom in a manner which should leave the area near the fish passage slots clear. We will evaluate the efficacy of this change during the 2006 fish passage season. Additional changes may be required if the smolt entrainment issue is not resolved in 2006.

Please feel free to call me at 508.792.7270 x133 if you have any questions regarding this matter.

A handwritten signature in black ink, appearing to read "Caleb Slater". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Caleb Slater
Anadromous Fish Project Leader