

REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE PAWTUCKET HYDROELECTRIC PROJECT (LIHI #11)

Prepared by Tyler Rychener

June 16, 2020

I. INTRODUCTION

This report summarizes the review findings of the application submitted by Pawtucket Hydropower, LLC (Applicant) to the Low Impact Hydropower Institute (LIHI) for re-certification of the Pawtucket No. 2 Hydroelectric Project, FERC P-3689 (Project). The Project was first Low Impact Certified by LIHI on July 7, 2004 and re-certified in 2009 and 2014. The current certificate had an expiration date of April 23, 2019 which was extended to July 15, 2020. The 1.6 MW Project is located on the Blackstone River at river mile 0.3 in Pawtucket, RI, at the Main Street Dam. The Project operates in a run-of-river mode.

On February 10, 2020 LIHI received a complete application for Low Impact Recertification of the Project. There have not been any material changes at the Project during the term of the previous Certification. However, there have been material changes in the LIHI Criteria and certification process since the Project was last certified, in that an updated Certification Handbook has been published by LIHI. This current review was made using the new 2nd Edition LIHI Certification Handbook (Revision 2.04, April 1, 2020). The original and prior recertification reviewer's reports can be found at: <https://lowimpacthydro.org/lihi-certificate-11-pawtucket-project-rhode-island-ferc-3689/>.

The current certification includes the following condition:

Condition 1. The owner of the Pawtucket hydropower facility shall continue to participate in efforts to restore fish passage in the lower Blackstone River, as documented in Memoranda of Agreement of 2007 (amended 2009) and 2012 with RIDEM. The owner shall keep LIHI fully informed of all progress, delays, and changes in these efforts and agreements. LIHI certification is contingent on the owner continuing to play a strongly supportive and proactive role in achieving the goals of the Blackstone River Fish Passage Restoration Project, subject to cooperation, material progress, and the appropriation of project funding from state and federal agencies. LIHI reserves the right to evaluate such progress and Pawtucket's role in it -- if the owner's commitment is deemed insufficient to achieve fish passage goals, LIHI certification may be suspended or rescinded. Within 60 days of recertification, the owner shall provide a status report to LIHI on the fish passage restoration project. Any changes in the MOAs shall be reported within 30 days of their execution. An updated status report on fish passage restoration shall be

included with the Facility’s annual compliance report to LIHI.

The condition remains active at this time. The Applicant reported in their 2020 annual compliance statement: “In 2019, NRCS engaged a technical consultant to re-evaluate alternative approaches to provide fish passage at the Main Street and Slater Mill Dams using available funding. The 2019 re-evaluation attempted to address fish passage considering a variety of site constraints. Initial reporting by the technical consultant (March 29, 2019 and April 8, 2019) indicate that the cost for implementing fish passage at the two lower most barriers would range from a low of \$8-20MM, depending on the alternative. Based on the consultant’s analysis there are trade-offs associated with each alternative relative to: ability to achieve/contribute to watershed restoration goals, cost (construction and operation), effectiveness, and permitting. PH continues to actively collaborate with the fish passage partners on the on-going re-evaluation and planning/implementing subsequent next steps.”

II. PROJECT’S GEOGRAPHIC LOCATION

The Project is located at a natural cascade at the head of tide in the mouth of the Blackstone River in the City of Pawtucket, Providence County, Rhode Island. The Blackstone River watershed is located in north-central Rhode Island with significant portions extending into Massachusetts. The river flows from north to south and drains into Narragansett Bay (Figure 1). The Blackstone River is highly developed with numerous dams located along its length. There are no dams located downstream of the Pawtucket No. 2 Project, Main Street Dam (RM 0.3). With a drainage area of about 475 square miles, the Blackstone River flows for about 48 miles south from its headwaters near Worcester, MA to the Main Street Dam in Pawtucket, RI. At this point, it becomes the headwater of the Seekonk River, which is a tidal estuary that flows for approximately seven miles before combining with the Providence River, which terminates in Narragansett Bay. The Blackstone River is the second largest source of freshwater to Narragansett Bay.

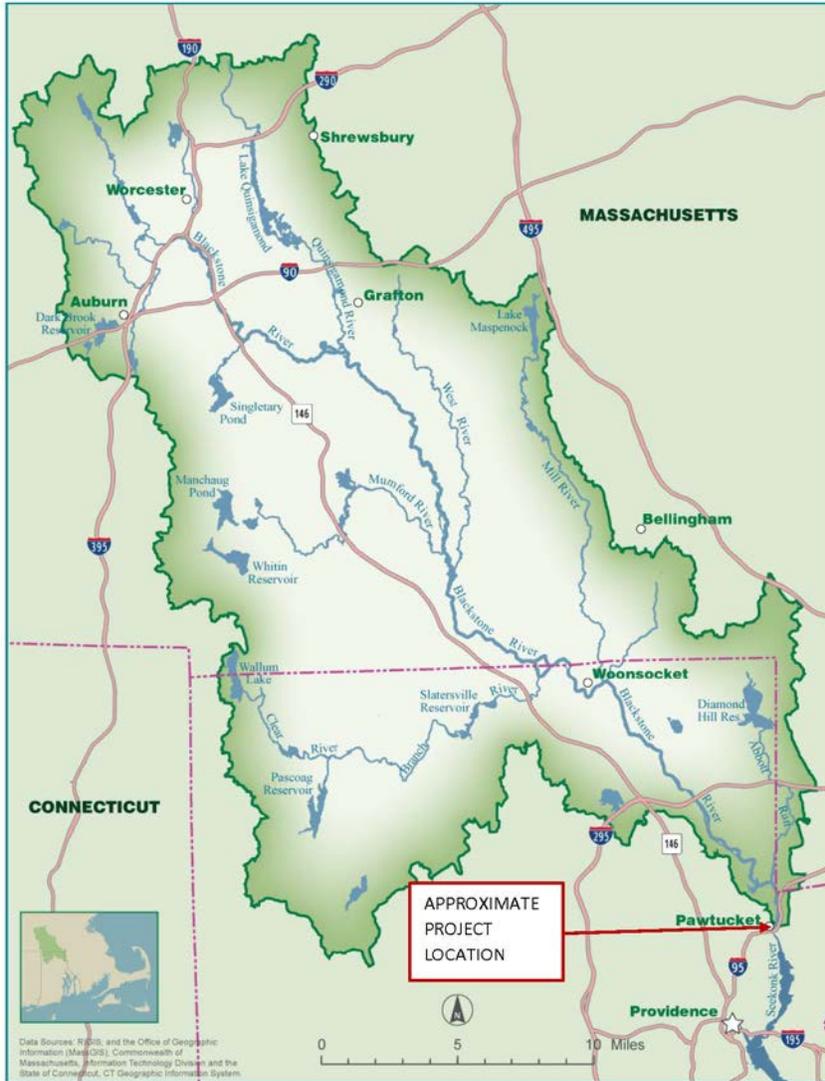


Figure 1 – Blackstone River Watershed

III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Project consists of a dam, spillway, intake, tunnel, forebay, penstock, and powerhouse (Figure 2) and was commissioned in 1989. The dam is constructed on top of a natural bedrock cascade and varies in height; the total length is approximately 200 ft. The dam is constructed of brick and timber with an overflow spillway section approximately 167 ft long. The maximum height of the dam is approximately 13 ft with a spillway crest elevation at 17.02 feet mean-sea-level. The Project is operated in instantaneous run-of-river mode; therefore, no reservoir storage is utilized for power generation.

Water enters the system through the intake structure located on the river right side of the dam. From there, water is conveyed through an underground, open channel flow, brick-lined tunnel conveyance system to the forebay (about 180 ft in length). The forebay is located within the powerhouse and includes a trashrack and head gate system with an automatic trash rake. The

trashrack clear spacing is 2.25 inches. From the forebay, water is conveyed into two penstocks approximately 130 feet in length to deliver water to each of the two turbines. After passing through the turbines, water discharges back into the Blackstone River by way of a subsurface tailrace about 90 feet long and 45 feet wide. The powerhouse building is approximately 90 feet long and 45 feet wide and includes 2 levels. The upper level houses the electrical equipment while the lower houses the turbines and generators. The turbines are full Kaplan units with a rated capacity of 800 kW each. The Project generates approximately 4,000 MWh annually.

Migratory fish species historically present in the Blackstone River include American eel, American shad, blueback herring, and alewife. In 2007, the Applicant entered into a fish passage Memorandum of Agreement (MOA) with Rhode Island Department of Environmental Management (RIDEM). There are no recreation facilities at the Project.

IV. ZONES OF EFFECTAND STANDARDS SELECTED

Three Zones of Effect (ZOE) were designated by the Applicant and were determined to be appropriate. Their locations are shown in Figure 3.

- ZOE #1 – The impoundment is located in the Blackstone River impoundment area, defined by the Applicant as the area between the Slater Mill Dam (upstream) and the Main Street Dam. ZOE #1 is about 350 feet long.
- ZOE #2 – The bypass reach is located between Main Street Dam and the confluence of the tailrace and the Blackstone River. ZOE #2 is about 440 feet long.
- ZOE #3 – The tailrace is located between the powerhouse and the Blackstone River and is about 275 feet long.

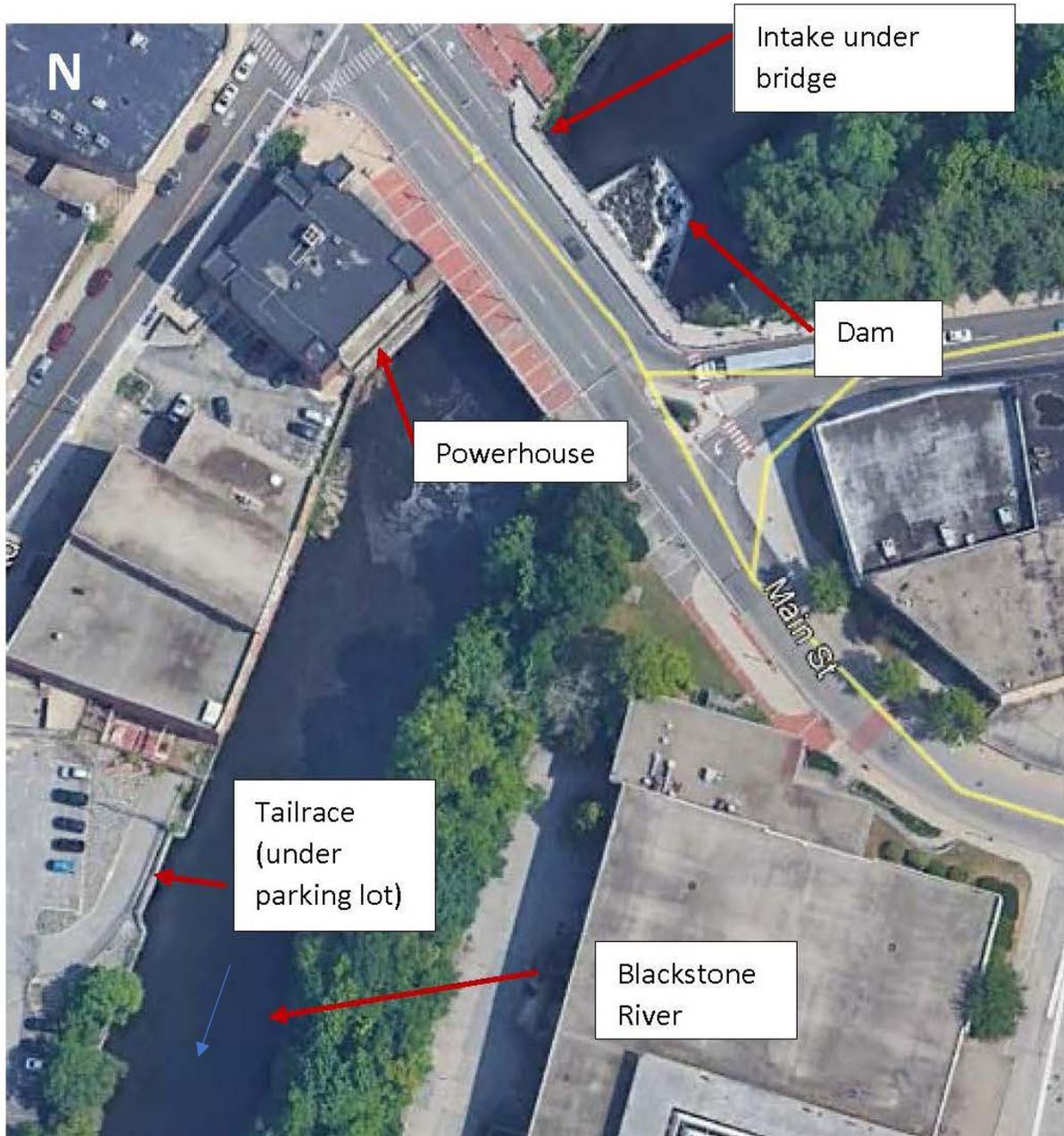


Figure 2 – Overview of Project Features

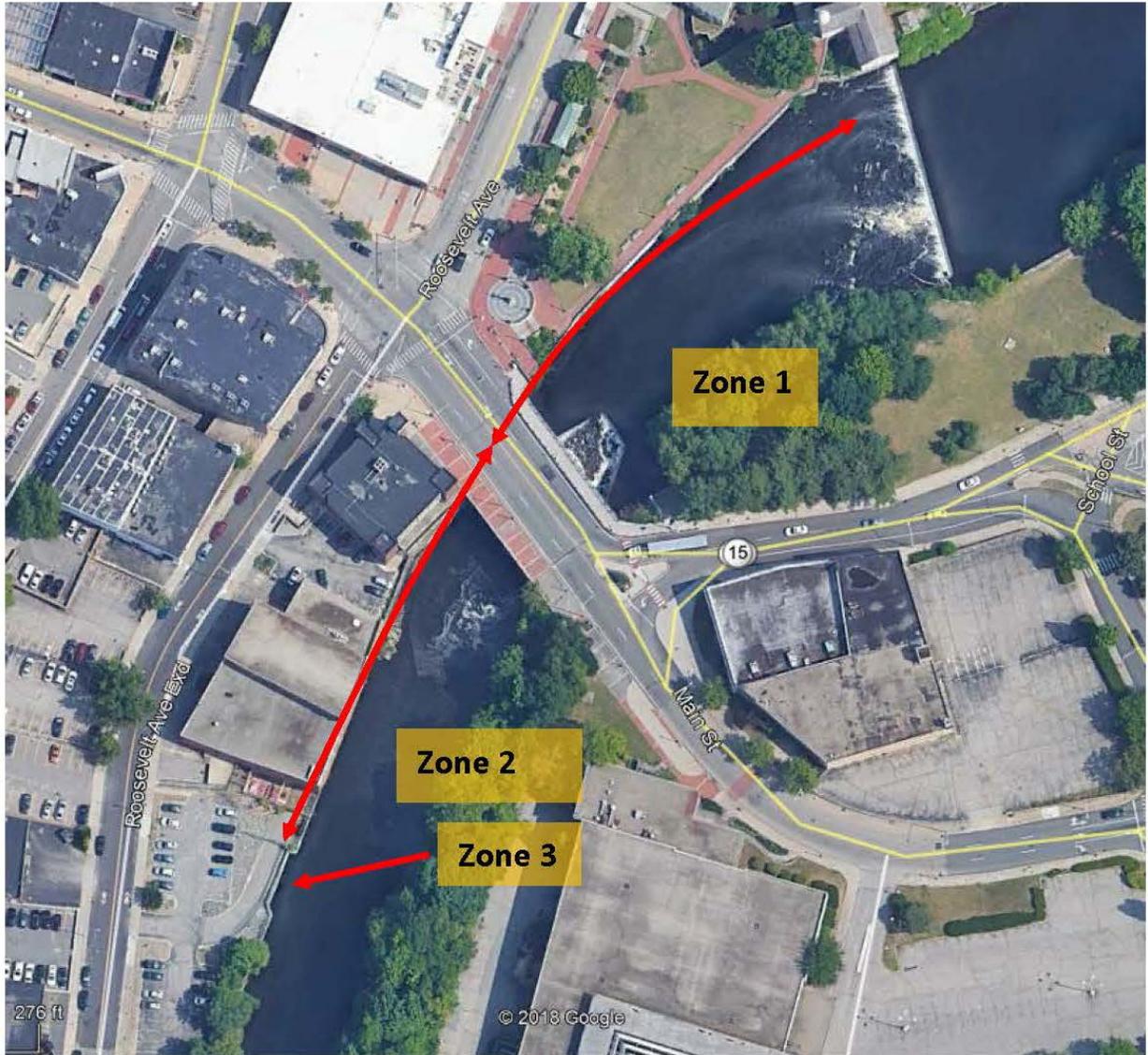


Figure 3 – Zones of Effect

The following tables show the Standards selected for each criterion for the three ZOE's. The review found that standards selected are appropriate. Details of compliance with the criteria are presented in Section VIII.

Table 1. Standards Matrix

Facility Name: Pawtucket Hydroelectric Project

		CRITERION and STANDARD SELECTED							
Zone No. and Name	Zone Length	A	B	C	D	E	F	G	H
		Ecological Flows	Water Quality	Upstream Fish Passage	Downstream Fish Passage	Shoreline and Watershed Protection	Threatened and Endangered Species	Cultural and Historic Resources	Recreational Resources
1: Impoundment	350 ft	1	1	1	2	1	1	2	1
2. Bypass	440 ft	2	1	2	2	1	1	1	1
3. Tailrace	275 ft	1	1	2	1	1	1	1	1

V. REGULATORY AND COMPLIANCE STATUS

The Project (P-3689-RI) was granted a 5MW or less license exemption by the Federal Energy Regulatory Commission (FERC) on July 21, 1981 and Water Quality Certificate (WQC) by the State of Rhode and Providence Plantations on November 10, 1992. The FERC elibrary was reviewed for the period of current certification and the Project appears to be in compliance with its exemption and WQC. The exemption includes Standard Article 2 which requires compliance with all terms and conditions issued by federal or state fish and wildlife agencies.

VI. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The application was posted for public comment on April 7, 2020 and the notice was forwarded to agencies and stakeholders listed in the application. The deadline for submission of comments on the LIHI certification application was June 6, 2020. No comments were received.

With no material changes since the last certification and the Project’s limited footprint, no additional outreach to agencies or stakeholders was conducted.

VII. DETAILED CRITERIA REVIEW

A. ECOLOGICAL FLOW REGIMES

Goal: The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

Assessment of Criterion Passage: The Applicant has appropriately selected Standard A-1, Not Applicable/De Minimis Effect for the impoundment and tailrace ZOE and Standard A-2 Agency Recommendation for the bypassed reach (Table B-1.2 of the application). However, in the associated text the Applicant states ZOE #3 is both standard A-1 and standard A-2. I believe the Applicant’s indication of Standard A-2 for ZOE #3 is a typo. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

Both the FERC license exemption and the WQC require the Applicant to operate the Project in run-of-river mode and maintain the impoundment at an elevation of 17.02 feet msl. Table 2 provides a description of operations and schedule of flows based on inflow. The WQC requires the Applicant to provide a 50 cfs minimum flow in the bypass reach. At the time of exemption proceedings, the US Fish and Wildlife Service (FWS) recommended 239 cfs minimum flow, the default New England summer base flow (0.5 cfsm). Both the US Environmental Protection Agency (EPA) and RIDEM originally recommended 115 cfs, the 7Q10 flow. FWS and EPA both acknowledged in 2004 that they based their recommendations on standard calculations and that the recommendations did not reflect the tidal nature of the waters below the project.¹ These agencies as well as the Rhode Island Department of Environmental Management, Fish and Wildlife Division all later agreed that the river is tidal up to the base of the dam (there is no purely freshwater habitat in the bypassed reach). The agencies agreed that the 50 cfs proposed

¹ <https://lowimpacthydro.org/assets/files/lihi-cert-app-files/PawtucketReviewFINAL.pdf>

by the exemption applicant would not violate water quality standards and that the flow was “adequately protective of water quality given the tidal nature of the river below the dam.”² Since the Project is operated in instantaneous run-of-river mode with all inflows equaling outflows, ZOE #3 is not affected in any way by the Project since it is downstream of all Project diversions.

Table 2. Project operations.

Flow Dispatch		
River Inflow (cfs)	Description of Operations	
0-135	Inflow is less than the Plant's minimum operating capacity. All flows released over the spillway.	
136-1280	Min flow of 50 cfs discharged over dam. Turbines operate from minimum flow of 86 cfs to maximum combined flow of 1,230 cfs.	
1281+	Min flow of 50 cfs discharged over dam. Turbines operate from minimum flow of 86 cfs to maximum combined flow of 1,230 cfs. Any flow exceeding 1,280 cfs is discharged over spillway.	
Flow Distribution		
River Inflow (cfs)	Primary Spillway	Turbine(s)
0 - 135	0 - 135	0
136-1280	50	86-1,230
1281 +	51 +	1,230

Based on my review of the application, supporting documentation, and publicly available information, the Project is operated in a manner that flows support habitat and other conditions suitable for healthy fish and wildlife resources. As such, the Project continues to satisfy this criterion.

B. WATER QUALITY

Goal: Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

Assessment of Criterion Passage: The Applicant appropriately selected Standard B-1, Not Applicable/De Minimis Effect for all ZOE's. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

Extensive monitoring efforts have been completed on the Blackstone River to track water quality and identify areas for improvement. In March 2018, RIDEM published the 2016 State of Rhode Island Impaired Waters Report³ which included information on the stretch of river on which the Project is located. According to the 2018 report, this stretch of river is designated as not supporting for Fish and Wildlife Habitat, Fish Consumption, Primary Contact Recreation and Secondary Contact Recreation. Additional information can be found in Table 3.

² <https://lowimpacthydro.org/wp-content/uploads/2014/08/LIHI-Agency-Letters-Pawtucket.pdf>

³ <http://dem.ri.gov/programs/benviron/water/quality/surfwq/pdfs/iwr16.pdf>

Table 3. Summary of March 2018 Assessment of Blackstone River at Project location.

Use Description	Use Attainment Status	Causes/Impairment
Fish and Wildlife Habitat	Not Supporting	Cadmium, Iron, Lead, DO, Phosphorus (total)
Fish Consumption	Not Supporting	Mercury in Fish Tissue, PCB in Fish Tissue
Primary Contact Recreation	Not Supporting	Enterococcus, Fecal Coliform
Secondary Contact Recreation	Not Supporting	Enterococcus, Fecal Coliform

The Project is not identified as the cause for any water quality impairments listed in Table 3.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion.

C. UPSTREAM FISH PASSAGE

Goal: The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard C-1, Not Applicable/De Minimis Effect for ZOE #1 and Standard C-2, Agency Recommendation for ZOEs #2 and #3. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

There are no mandatory prescriptions for fish passage in the exemption, but the exemption includes standard article 2 which requires compliance with all terms and conditions issued by federal or state fish and wildlife agencies. No agencies have yet requested or required fish passage at the Project. A detailed background of fish passage at the Project can be found in the original certification review report⁴ and staff report⁵.

Natural falls occur at the Pawtucket Project and may have blocked passage for all species except American eels. American shad, blue back herring, and alewife may have historically occurred in the Blackstone River although the prior owner disputed that conjecture based on differing interpretations of historical documents⁶. Regardless, there is a state river fishery restoration plan that has been in place since 2002, although not yet implemented, that constitutes the current agency recommendation for upstream fish passage. Several upstream projects on the Blackstone River are currently in the licensing or relicensing process. A review of these relicensing documents indicates that American eel have been identified upstream in the Blackstone River

⁴ <https://lowimpacthydro.org/assets/files/lihi-cert-app-files/PawtucketReviewFINAL.pdf>

⁵ <https://lowimpacthydro.org/assets/files/lihi-cert-app-files/staffreportPawtucket.pdf>

⁶ <https://lowimpacthydro.org/wp-content/uploads/2014/08/C.-Rosenfield-critique-of-Buckley-and-Nixon-report.pdf>

and may be able to pass the dams on their own.

There have been extensive and ongoing efforts to evaluate the feasibility of fish passage at the first four dams on the Pawtucket River. These dams include Pawtucket No. 2 Dam, Slater Mill Dam, Elizabeth Webbing Dam and Central Falls Dam, respectively. However, installation of fish passage at each of these dams or implementation of truck and trap facilities at these four projects would allow access to only about 200 acres of historic spawning habitat for anadromous fish. These four dams are collectively referred to as the Lower Blackstone Dams.

The first obstruction to anadromous fish migrations reported began in 1713 “*when the new Pawtucket Main Street Bridge was built. The river was filled in with earth to support the bridge and to make a passage for carriages and wagons. In doing this, the river was narrowed considerably, becoming confined to the main channel and blocking Little River and thus the route that migrating fish could use...*”⁷ There is also information suggesting that the Little River, a small stream that ran around the falls to the west, provided passage. The Little River was reopened in 1718 by the digging of Sargent’s Trench to again provide passage but dams were placed in the trench between 1741 and 1761. A second trench was reportedly constructed during that period, but prior to the 1761 dam which would have again blocked passage.

According to one source, the upstream Slater Mill dam in the 1790’s “initiated the decline in anadromous fish” in the river.⁸ However, a dam at the current Project location (the “lower dam”) was constructed in 1718 and later raised by 2 feet around the same time as Slater Mill dam was constructed.⁹

Several assessments and planning studies for fish passage restoration have been completed to identify and evaluate specific measures to restore fish passage in the Blackstone. Building on these studies, the Rhode Island Natural Resources Conservation Service (NRCS), the RIDEM, FWS, the United States Army Corps of Engineers (USACE), Pawtucket Hydropower, LLC (PH), Old Slater Mill Association (OSM), and a variety of other stakeholders worked collaboratively to design and permit Denil style fish ladders at the first two barriers on the Blackstone in 2010. Efforts in 2010 included provisions for passage at the first four dams on the river in order to provide access to valuable spawning and rearing habitat upstream of the fourth dam (Valley Falls Dam) consistent with the Phase I Restoration goals outlined in the 2002 Blackstone River Fisheries Restoration Plan¹⁰, namely, to restore self-sustaining populations of shad and river herring (but not Atlantic salmon) to the Blackstone River basin.

Fish passage installation at the Lower Blackstone Dams is complicated for several reasons. The majority of the spawning habitat is upstream of the Central Falls Project (the fourth upstream dam). Therefore, a coordinated effort at all four lower Blackstone dams is required to provide benefits to the fishery. The Main Street dam is a contributing element and the Slater Mill dam is a significant feature of the Blackstone River Valley National Historic Park (see Section VII.G below); making new construction challenging. The Slater Mill dam and Elizabeth Webbing dam

⁷ <https://lowimpacthydro.org/wp-content/uploads/2014/08/Buckley-and-Nixon-Report.pdf>

⁸ <https://blackstoneriver.org/projects/fish-passage-fish-ladders/>

⁹ <https://lowimpacthydro.org/wp-content/uploads/2014/08/Buckley-and-Nixon-Report.pdf>

¹⁰ <http://www.edc.uri.edu/restoration/html/intro/Blackstone%20River%20Fisheries%20Restoration%20Plan.pdf>

do not have hydroelectric generation and associated revenue streams that might be used to finance passage facilities. Finally, the geometric characteristics of some of the projects are challenging from a constructability perspective. Specifically, at Pawtucket, there are rock outcroppings, spillway capacity impacts, bridge foundations and vertical stone retaining walls that add complexity and require consideration.

In 2007, the previous Project owner entered into a fish passage Memorandum of Agreement (MOA) with RIDEM which included various obligations (Attachment A of the application). This MOA was later transferred with Project ownership to the current owner. There have not been any amendments to the MOA since it was executed. Project obligations include:

- Pawtucket Hydro agrees to work with NRCS towards a mutually acceptable fishway design developed by NRCS which are compatible with continued viable operations of the hydroelectric plant.
- Pawtucket Hydro will contribute \$100,000 to be used as a contribution to the matching funds required by NRCS
- Once fish passage is installed, Pawtucket Hydro will contribute annual payments to the annual operation and maintenance of the fishways.
- Pawtucket Hydro will provide all flows necessary to operate the fishways effectively during fish passage seasons.
- Pawtucket Hydro will develop an operations plan to ensure flows in the fishway are maintained within 60 days of fish passage operation notification.
- Pawtucket Hydro will allow representatives of DEM to enter the property on which the dam and fishway are located for monitoring

RIDEM's key obligations under the MOA are summarized as follows:

- Upon completion of the fishway RIDEM shall assume responsibility of the operation and maintenance of fish passage facilities.
- RIDEM covenants not to take any other administrative, judicial or other action, either alone or together with other state and/or federal agencies to obtain further funding from Pawtucket Hydro towards the design, construction or operation of the subject fish passage Project, beyond the amount specifically committed to in the MOA.

Although designed and permitted in 2010, the passage facilities at the first two barriers (Pawtucket, a.k.a. Main Street dam and Old Slater Mill dam) were not constructed due to construction costs well in excess of available agency funding. Subsequently, project partners have worked to identify more economic solutions to achieving restoration goals. As a result of these investigations, the partners discovered technical flaws in the initial designs which would have negatively impacted the effectiveness of the first passage facilities; an impact that would have constrained the effectiveness of all upstream facilities, and by extension, the accomplishment of the watershed fishery restoration goals.

In 2019, NRCS engaged a technical consultant to re-evaluate alternative approaches to provide fish passage at the Main Street and Slater Mill dams using available funding. The 2019 re-evaluation attempted to address fish passage considering a variety of site constraints, including, but not limited to:

- Historic significance of both dams;

- Constructability, primarily associated with work under bridges and water control;
- Fish passage entrance siting and false attraction;
- Fish passage effectiveness, at individual locations and the cumulative impact as migrating fish move upstream, and;
- Cost/Benefit, providing access to habitat upstream of the Slater Mill Dam is expected to provide limited ecological benefit.

Initial reporting by the technical consultant (March 29, 2019 and April 8, 2019) indicate that the cost for implementing fish passage at the two lower most barriers would range from a low of \$8-20 million, depending on the alternative. A subsequent design review meeting (July 15, 2019, a) removed passage facilities at the Slater Mill Dam from consideration and identified a vertical-slot fishway as the preferred alternative at the Main Street Dam; the cost estimate for this single passage facility was updated to \$9- 19MM. There have not been any amendments to the MOU since the previous certification. Attachment A of the application contains additional details and a presentation from the July 2019 meeting.

There are currently no plans or agreements in place for providing passage at the next three upstream barriers. Based on the consultant's analysis there are trade-offs associated with each alternative relative to: the ability to achieve/contribute to watershed restoration goals, cost (construction and operation), effectiveness, and permitting. The Applicant continues to actively collaborate with the fish passage partners on the on-going re-evaluation, planning and eventual implementation of an effective fish passage restoration strategy for the Project and watershed.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion. Given the complex issues associated with restoring fish access to the Blackstone River and the continued efforts of the Applicant to participate with stakeholders to implement upstream fish passage facilities, I recommend continuing to include LIHI Condition 1 in the recertification for this Project.

D. DOWNSTREAM FISH PASSAGE AND PROTECTION

Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Project operations. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard D-2, Agency Recommendation for ZOE #1 and #2, and Standard D-1 Not Applicable/De Minimis Effect for ZOE #3. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

A review of the recent relicensing documents for the upstream Woonsocket Falls Project (FERC No. 2972) indicate that typical species within the Blackstone River include blacknose dace, common shiner, fallfish, longnose dace, tessellated darter, yellow bullhead, smallmouth bass, largemouth bass, pumpkinseed, and yellow perch, among others.

Fish in the impoundment are able to pass downstream into the bypass reach with minimum flows provided over the dam crest. The Project's trashracks at the powerhouse intake have 2.25 inch clear spacing which reduce the intake velocity to 1.0 feet per second and prevent fish from passing downstream through the turbines and into the tailrace.

As part of the fish passage efforts discussed in Section E, design options to install downstream fish passage have been developed. The Applicant would install downstream fish passage at the Main Street Dam concurrently with the upstream fish passage. Similar to the upstream fish passage, the Applicant is committed to uphold all obligations outlined in the fish passage MOA.

Downstream of the Pawtucket Dam, the Blackstone River converges with the tidally influenced Seekonk River and Narragansett Bay; therefore, the bypass reach is brackish water (mix of fresh and salt water). No site-specific data is available for typical riverine fish species in the bypass reach. However, a study was conducted in 2018 by RIDEM and The Nature Conservancy¹¹ which identified fish located in the Seekonk and Providence rivers through monthly sampling from May to October 2018. Species identified included silversides, mummichogs, killifish, menhaden, tautog, winter flounder, scup, white perch, bluegill. The Project does not prevent fish from moving from the bypass reach downstream to the Seekonk River and Narragansett Bay.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion.

E. SHORELINE AND WATERSHED PROTECTION

Goal: The Facility has demonstrated that enough action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard E-1, Not Applicable/De Minimis Effect in all ZOE's. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

There are no provisions or requirements for shoreline management in the FERC license or WQC. The Project operates in instantaneous run-of-river therefore causing no unnatural water surface fluctuations. There are no resource agency recommendations or license exemption conditions regarding watershed protection. The Project is located in an urban location with a very small footprint, and there are no lands of ecological significance associated with the Project.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion.

¹¹ <https://www.ecori.org/natural-resources/2018/11/2/upper-narragansett-bay-fish-survey-yields-surprising-results>

F. THREATENED AND ENDANGERED SPECIES PROTECTION

Goal: The Facility does not negatively impact federal or state listed species.

Assessment of Criterion Passage: The Applicant appropriately selected Standard F-1, Not Applicable/De Minimis Effect for all ZOE. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

The FERC exemption order and the WQC do not contain threatened and endangered species-related requirements. In May 2019, the Applicant used the FWS’s Information for Planning and Consultation (IPaC) online tool to complete a site-specific review of federal threatened and endangered species. The IPaC review identified one threatened mammal, the Northern long-eared bat (*Myotis septentrionalis*), whose range potentially includes the Project area. There are no critical habitats for the species. FWS’ rule 4(d) prohibits tree cutting within ¼ mile of hibernacula and prohibits cutting of known roost trees during summer months. The Applicant stated in its application that there are no overhead powerlines or other landscape features that require any vegetation management that would have the potential to impact the species.

By e-mail to the Applicant, dated January 28, 2020, RIDEM indicates there is a non-location specific observation for common nighthawk, listed as a species of state concern. About a mile downstream are colonies of salt reedgrass (state concern) and tall white beard-tongue (state threatened plant). RIDEM indicated that the Project is not expected to affect these populations. Project operations and maintenance activities do not include vegetation management or powerline facilities. I have not identified any Project related activities with potential to affect these species.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion.

G. CULTURAL AND HISTORIC RESOURCE PROTECTION

Goal: The facility does not unnecessarily impact cultural or historic resources that are associated with the Facility’s lands and waters, including resources important to local indigenous populations, such as Native Americans.

Assessment of Criterion Passage: The Applicant appropriately selected Standard G-2, Agency Recommendation for ZOE#1 and Standard G-1, Not Applicable/De Minimis Effect for ZOEs #2 and #3. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

There are no requirements in the exemption regarding cultural resources protection.

The Blackstone River Valley of Massachusetts and Rhode Island is the birthplace of the

American Industrial Revolution¹². The first cotton mill in the United States was commissioned in about 1793 at Slater Mill (immediately upstream of the Main Street dam) and the success at Slater Mill inspired other entrepreneurs to build more mills first in the Blackstone Valley and eventually throughout New England. The Pawtucket Main Street dam is a contributing resource in the Old Slater Mill Historic Site National Historic Landmark District¹³, and the powerhouse which was built in 1894 (Bridge Mill Power Plant) is individually listed on the National Register of Historic Places¹⁴.

The current Main Street Dam was reportedly constructed in 1894, and the reservoir (ZOE #1) extends to the toe of the Slater Mill Dam. Maintenance of the Main Street dam and associated civil structures is key to maintaining historic structures in the Blackstone River Corridor. The date of other structure construction is unknown.

The banks of the bypass reach are highly modified/armored and consist of mill buildings forming the right bank and vertical retaining walls forming the left bank. The area is highly industrialized and has been disturbed numerous times since the 1800s. According to RIDEM in its 2004 letter, the natural tidal tailwater backwaters to the toe of the Main Street dam so Project operation has no effect on the bypass reach.

The tailrace is a small subsurface structure formed under an adjacent paved area in a previously disturbed area.

The Applicant consulted with the State SHPO office during preparation of the final recertification application. The February 3, 2020 response from SHPO states that the continued operation of the Project will have no adverse effect on historic properties.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion.

H. RECREATIONAL RESOURCES

Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

Assessment of Criterion Passage: The Applicant appropriately selected Standard H-1, Not Applicable/De Minimis Effect for all ZOE's. There have been no Project changes related to this criterion since the previous LIHI certification in 2014.

There are no requirements in the exemption regarding recreational resources. The reservoir is very small and extends from the Main Street Dam to the Slater Mill Dam. The area is highly urbanized with retaining walls along the shoreline (see Figure 3). The reservoir abuts the Historic Slater Mill site (part of the Blackstone River Valley National Historic Park). The Slater Mill site

¹² <https://blackstoneheritagecorridor.org/learning/history-of-the-valley/the-industrial-revolution-the-big-story/>

¹³ https://catalog.archives.gov/OpaAPI/media/41374777/content/electronic-records/rg-079/NPS_RI/66000001_NHL.pdf

¹⁴ https://catalog.archives.gov/OpaAPI/media/41374480/content/electronic-records/rg-079/NPS_RI/83003805.pdf

includes an interpretive center/museum as well as a paved walkway allowing opportunities for viewing the Slater Mill Dam and the Project reservoir. The Project intake is located under the Main Street bridge and is not visible from the park, or any of its viewing areas.

The bypass is also highly developed with tall vertical constructed walls forming the riverbanks. There is no safe access to the bypass from any areas within the Project boundary. The tailrace is subsurface and is not accessible under any conditions.

Based on my review of the application, supporting documentation, and publicly available information, I believe the Project continues to satisfy this criterion.

VIII. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on my review, I believe that the Project meets the requirements of Low Impact Certification and recommend it be re-certified for a five-year period with continuation of the condition in the current certification, shortened and reworded below.

Condition 1. The facility Owner shall continue to participate in efforts to restore fish passage in the lower Blackstone River in accordance with the MOA with RIDEM. The Owner shall keep LIHI fully informed of all progress, delays, and changes in these efforts and agreements. Any changes in the MOAs shall be reported within 30 days of their execution. An updated status report on fish passage restoration shall be included with the facility's annual compliance submittal to LIHI. LIHI certification is contingent on the Owner continuing to play a strong supportive and proactive role in achieving the goals of the Blackstone River Fish Passage Restoration Project where feasible.