

LAWRENCE HYDROELECTRIC PROJECT

LIHI APPLICATION

ATTACHMENT #12

FACILITY DESCRIPTION

Facility Description:

The Project works consisting of: (1) a 33-foot high, 900-foot-long dam of rubble masonry construction with five-foot-high inflatable flashboard system; (2) a 9.8-mile-long reservoir having a surface area of 655 acres at normal high water elevation 44.17 feet mean sea level (msl) and a maximum storage capacity of approximately 19,900 acre-feet; (3) the existing South Canal approximately 35 feet wide and 10 feet deep, originating at the south abutment of the Essex Dam and generally paralleling the Merrimack River bed, below the Essex Dam, for a distance of approximately 2,750 feet; (4) the existing North Canal, approximately 95 feet wide and 15 feet deep, originating at the north abutment of the dam and paralleling the Merrimack River below the dam for a distance of approximately 5,300 feet; (5) fish passage facilities including a fish elevator installed at the dam, a downstream fish bypass and an eel ladder; (6) a powerhouse containing two 8.4 MW hydroelectric generating units and a tailrace channel extending into the Merrimack River Channel; and (7) appurtenant facilities.

Project Operation

The Lawrence Project is operated in a run-of-river mode through use of an automatic pond level control (PLC). The upstream fish passage operation typically begins annually in late April and continues through mid-July and from mid-September through October, with final operation schedule determined in consultation with resource agencies. Upstream fish passage lifts generally occur between 8:00am to 4:00pm daily during the operational periods and maintains operations up to river flows of 25,000 cfs with a 120 cfs attraction flow provided for the fish elevator system. The downstream fish passage bypass operation typically begins annually on April 1 and continues through mid-July and from September 1 through November 15, with final operation schedule determined in consultation with resource agencies.

The Lawrence Project's dam is equipped with a pneumatic inflatable flashboard system. The system varies air pressure to adjust the flashboard height to maintain normal headpond elevation at the Project based on the river user needs, flow and weather conditions. The installation of the system eliminated the need for impoundment drawdowns required for flashboard replacement, enhanced river debris management with reduced debris build up near the dam, enhanced high flow condition management and reduced false fish attraction away from the fish passage facilities often caused by board leakage and partial board loss.

The South Canal is closed annually during the spring and fall outmigration seasons. The South Canal is closed each year after the 3-day average Merrimack River flow drops to 12,000 cfs or lower. The South Canal is reopened on July 15 and closed. In the fall, the South Canal is closed from September 1 to November 15.³



Lawrence Project General Site Plan



Photo 12A: Lawrence Project



Photo 12B: Lawrence Dam (during spill conditions)



Photo 12C: Lawrence Dam Flashboards



Photo 12D: Lawrence Downstream Fish Passage Entrance



Photo 12E: Lawrence Downstream Fish Passage Transport Chute to Tailrace



Photo 12F: Lawrence Powerhouse and Tailrace



Photo 12G: Lawrence downstream fish passage chute



Photo 12H: Lawrence Upstream Fish Passage Exit Channel Trap



Photo 12I: Lawrence Upstream Eel Passage



Photo 12J: Lawrence Upstream Eel Passage Collection Tank



Photo 12K: Lawrence Upstream Fish Passage Elevator Entrance Channel



Photo 12L: Lawrence Upstream Fish Passage Hopper Pit



Photo 12M: Upstream Fish Passage Exit and Attraction Water inlet chamber



Photo 12N: Fish Passage Holding Tanks



Photo 12O: Lawrence Horizontal Unit



Photo 12 P: Lawrence Forebay



Photo 12 Q: Lawrence Impoundment



Photo 12R: Lawrence Tailpool