



Resources, Ownership, Boundaries, and Land Rights Study Report

Lowell Hydroelectric Project (FERC No.
2790)

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List of Acronyms

Boott	Boott Hydropower, LLC (or Licensee)
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commonwealth	Commonwealth of Massachusetts
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission (or Commission)
FGMP	Final General Management Plan
GIS	Geographic Information System
GPS	Global Positioning System
ILP	Integrated Licensing Process
ISR	Initial Study Report
LHPC	Lowell Historic Preservation Commission
LNHP	Lowell National Historical Park
MADCR	Massachusetts Department of Conservation and Recreation
MADEM	Massachusetts Department of Environmental Management
MOU	memorandum of understanding
MW	megawatt
NHL	National Historic Landmark
NOI	Notice of Intent
NPS	National Park Service
PAD	Pre-Application Document
Project	Lowell Hydroelectric Project (or Lowell Project)
Proprietors	Proprietors of the Locks and Canals
PSP	Proposed Study Plan
RM	river mile
RMP	Resources Management Plan



ROR	run-of-river
RSP	Revised Study Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SPD	Study Plan Determination
Study Workshop	Lowell Hydroelectric Project Study Workshop

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1 Introduction and Background

Boott Hydropower, LLC (Boott or Licensee) is the Licensee, owner, and operator of the 20.2-megawatt Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (C.F.R.) Part 5.

In accordance with 18 C.F.R. § 5.15, Boott has conducted studies as provided in the study plan and schedule approved in the Commission's March 13, 2019 Study Plan Determination (SPD) for the Project.¹ This report describes the methods and results of the approved Resources, Ownership, Boundaries, and Land Rights Study conducted in support of a new license for the Project.

1.1 Project Description and Background

The Lowell Project is located at river mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of:

- 1) A 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket Dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones;
- 2) A 720-acre impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29;
- 3) A 5.5-mile-long canal system which includes several small dams and gatehouses;
- 4) A powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW);
- 5) A 440-foot-long tailrace channel;
- 6) Four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal systems containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW;

¹ The Commission issued a Revised Process Plan and Schedule on June 12, 2020.

- 7) A 4.5-mile-long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid;
- 8) Upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field Powerhouse, and a vertical-slot fish ladder at the Pawtucket Dam; and
- 9) Appurtenant facilities.

At the normal pond elevation of 92.2 feet NGVD 29 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control and has no usable storage capacity.

The Project's primary features are located along the Merrimack River in the City of Lowell, Massachusetts. The City of Lowell was founded in the early 1820s by Boston merchant capitalists and became one of the most significant planned industrial cities in America. Lowell's factory system, which used the waterpower of the Merrimack River, incorporated new technologies to provide for the mass production of cotton cloth in mills throughout the city (National Park Service [NPS] 1981). Lowell established the pattern for large-scale waterpower development for the next 50 years.

Several Project facilities are located within overlapping locally, state, and nationally designated parks and historic properties/preservation districts. The Project's Pawtucket Dam and E.L. Field Powerhouse are located along the mainstem of the Merrimack River. The existing Project's two-tiered network of man-made canals extends throughout downtown Lowell. In addition to the Pawtucket Dam and hydroelectric developments, the existing Project also includes miscellaneous civil works in the City of Lowell, including the Guard Lock and Gates, Moody Street Feeder Gatehouse, Lawrence Dam, Hall Street Dam, Tremont Wasteway, Lower Locks and Dam, Swamp Locks and Dam, Merrimack Dam, Rolling Dam, and Boott Dam. As discussed in Boott's December 2, 2020 DLA for the Project, operation of the canal units is no longer economically feasible, and Boott has proposed to remove the downtown developments (Assets, Bridge Street, Hamilton, and John Street) and associated canal infrastructure from the Project's FERC license. Boott is not proposing to restart or continue generation at these four developments.

The canal system, the downtown mill sites, and many of the Project's civil works, are contributing resources to Lowell Locks and Canals National Historic Landmark (NHL) District. The canal system and many Project facilities are also located within the Lowell National Historical Park (LNHP) managed by the NPS and the larger Lowell Historic Preservation District. The LNHP was established by Congress in 1978 to "preserve and interpret the nationally significant historical and cultural sites, structures, and districts in Lowell, Massachusetts, for the benefit and inspiration of present and future generations." The park is by design a partnership park in which federal, state, and local governments as well as the private sector and local community carry out the legislative intent of the

park unit. The LNHP is also listed on the National Register of Historic Places (NRHP), and certain properties within the park overlap with properties in the NHL District.

The Lowell Heritage State Park, established in 1974 as a precursor to the LNHP, is also located within the City of Lowell and is comprised of linear greenways along the Merrimack River and canal system and a collection of historic buildings and structures related to the industrial development of the city. These buildings and structures include Project features and properties located within the NHL District. The Lowell Heritage State Park is operated by the Massachusetts Department of Conservation and Recreation (MADCR) and features exhibits created in partnership with the NPS (MADCR 2018). With the exception of the Rynne Bathhouse, all of the built resources within the Lowell Heritage State Park fall within the Lowell Historic District, designated by the City of Lowell to “...ensure that development activities within the district are consistent with the preservation of its 19th century setting” (MADCR 2014). Portions of the Lowell Heritage State Park also overlap with the Lowell Locks and Canals NHL District and the LNHP.

Ownership, boundaries, and land/access rights of the downtown canal system in Lowell are complex. The existing Project is situated within several different and overlapping parks, and preservation/conservation districts. The park is by design a partnership park in which federal, state, and local governments as well as the private sector and local community carry out the legislative intent of the park unit.

On April 30, 2018, Boott initiated the ILP by filing a Pre-Application Document (PAD) and Notice of Intent (NOI) with the Commission. Major ILP milestones to-date are presented below in Table 1-1.

Table 1-1. Major ILP Milestones Completed

Date	Milestone
April 30, 2018	PAD and NOI Filed
June 15, 2018	Scoping Document 1 (SD1) Issued by FERC
July 17, 2018	FERC Agency and Public Scoping Meetings Conducted
July 18, 2018	Project Site Visit Held
September 27, 2018	Scoping Document 2 (SD2) Issued by FERC
September 28, 2018	Proposed Study Plan (PSP) Filed
October 18 & 19, 2018	PSP Meeting Conducted
January 28, 2019	Revised Study Plan (RSP) Filed
March 13, 2019	FERC Issued SPD
February 25, 2020	Initial Study Report (ISR) Filed
March 11, 2020	ISR Meeting
June 12, 2020	FERC Issued Revised Process Plan and Schedule

September 30, 2020	Revised ISR Filed
December 2, 2020	Draft License Application (DLA) Filed
February 25, 2021	Revised ISR Filed
April 30, 2021	Final License Application (FLA) Filed

Boott has continued consultation with stakeholders regarding the approved studies as required by the Commission's SPD. In accordance with the approved study plan, Boott has also provided stakeholders with Quarterly ILP Study Progress Reports that include a description of study activities conducted during the previous quarter, activities expected to occur in the next quarter, and identified variances from the approved study plan.

2 Study Goals and Objectives

The goal of this study is to determine current ownership of resources within the canal system and existing Project Boundary, and document maintenance responsibilities, access rights, and FERC jurisdiction. The specific objectives of this study are as follows:

- Determine the current ownership of resources within the canal system in a comprehensive manner;
 - Record maintenance responsibilities and obligations to resources within the canal system;
 - Clarify FERC jurisdiction;
 - Document recreational, educational, or other land access rights to resources within the canal system; and
- Work with the MADCR, NPS, City of Lowell, and other parties to develop a Geographic Information System (GIS) database of resources, ownership, boundaries, and land rights.

3 Study Area

In accordance with the Commission's SPD, the study area for the Resources, Ownership, Boundaries, and Land Rights Study includes the existing FERC Project Boundary and associated structures in the downtown area (Appendix A).

4 Methodology

4.1 Literature Review and Analysis

Boott conducted desktop research and a literature review to compile and review available ownership and rights documentation to obtain a better understanding of the rights and responsibilities related to resources within the Project Boundary. As appropriate and relevant, public guidance and conceptual planning and/or management documentation was reviewed by Boott including the following:

- The 1980 *Details of the Preservation Plan*² prepared by the Lowell Historic Preservation Commission (LHPC), containing technical materials including a description of agreed-upon agency roles at the City, State, and Federal level.
- The 1981 *Final General Management Plan (FGMP)*² developed by NPS to provide a basis for visitor use, resource management, and general development within the LNHP.
- The 1990 *Preservation Plan Amendment*² developed by the LHPC summarizes accomplishments of the LNHP and outlines its proposed activities.
- The 1991 *Memorandum of Understanding (MOU)* executed by MADCR, NPS, and Boott for the purpose of maintaining, managing, and operating the Lowell canal system (MOU 1991).

On December 18, 2019, Boott held a Lowell Hydroelectric Project Study Workshop (Study Workshop)³ with stakeholders. During the Study Workshop it was suggested that three legal documents establish most of the ownership, responsibilities, and land rights to the Lowell canal system. The 1984 *Deed, Bill of Sale and Grant of Easements*, also known as the “*Great Deed*” (Appendix B) details the sale of portions of the Project from the Proprietors of the Locks and Canals on the Merrimack River (Proprietors)⁴ to Boott, as well as associated access and repair easements. The 1986 *Order of Taking* (Appendix C) details the take of properties, rights, and responsibilities from Boott and Proprietors to the Commonwealth, operating through MADCR. The 1995 *Grant of Easement* (Appendix D) describes the easement rights provided to the NPS from MADCR for specific properties and parcels around the canal system.

² This plan was approved by FERC on March 20, 2019 as a Comprehensive Plan under section 10(a)(2)(A) of the Federal Power Act.

³ The meeting minutes of the December 18, 2019 Study Workshop were appended to the ISR filed with FERC on February 25, 2020.

⁴ Proprietors is an existing limited liability corporation founded on June 27, 1792 to construct the Pawtucket Canal. In the early 1960s, the company was acquired by a group of Lowell investors who restructured its assets. Boott acquired much of the Lowell Project, including the Pawtucket Dam, from the Proprietors in December 1984.

4.2 Geographic Information System Database

The GIS Database was developed using ESRI's ArcMap, ArcCatalog and ArcGIS Online. The GIS database has been published to create an existing service feature in ArcGIS Online. Incorporated into the GIS database is a point feature class with surveyed plans, .tiff and .jpg images. The Facility Location point feature class was created by spatially locating each parcel centroid listed on the existing exhibit maps relevant to any know easement or right of way along the power canals in Lowell, MA. The point features known as "Facility Location" were spatially located from several sources including existing exhibit maps, Google Earth and the LNHP website. Real Property GIS files were obtained from the City of Lowell Assessors office in January 2021 and are used to display background data as well as locating parcel ID and owner. Additionally, to enhance the user experience, each exhibit map was georeferenced to the parcel centroid in an effort to display the correct location within the canal system. Exhibit map images in the geodatabase appear as a pop-up in the known location.

This features in ArcGIS were converted into a publicly-accessible GIS database using ArcGIS Experience Builder and can be viewed here:

<https://experience.arcgis.com/experience/f9e9b945e80c49daa767f50e218e0181/>

5 Study Results

Pursuant to the approved study plan, Boott reviewed several sources to understand the ownership, rights, and responsibilities related to resources within the Project Boundary. The results of this analysis are divided into the following sections:

- **Section 5.1 Conceptual Planning of the Lowell Canal System:** identifies responsibilities and rights as presented in comprehensive plans and public planning documents issued for development and management of the Lowell canal system.
- **Section 5.2 Ownership of the Lowell Canal System:** presents the complex legal ownership of structures of the Lowell canal system based on a review of the 1984 *Great Deed* and 1986 *Order of Taking*.
- **Section 5.3 Easement Rights to the Lowell Canal System:** presents the legal easement rights to structures of the Lowell canal system based on a review of the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*.
- **Section 5.4 Resource Rights in the Lowell Canal System:** identifies specific resources and their ownership and/or easement rights based on a review of public planning documents and the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*.
- **Section 5.5 Historical Management Agreements:** discusses the two known historical management agreements which reflect the parties understanding of legal ownership, easement and resources, and management responsibilities.
- **Section 5.6 FERC Jurisdiction:** addresses one of the goals of the approved study plan by clarifying FERC jurisdiction.

The materials in this report comprise Boott's understanding of ownership, easement rights and resource rights to the Lowell canal system based on a review of planning documents, legal documents, and other available information. This report is limited to the documentation available to Boott during the course of the study. Further, this information is not intended to serve as legal or professional advice by Boott and should not be construed as such.

5.1 Conceptual Planning of the Lowell Canal System

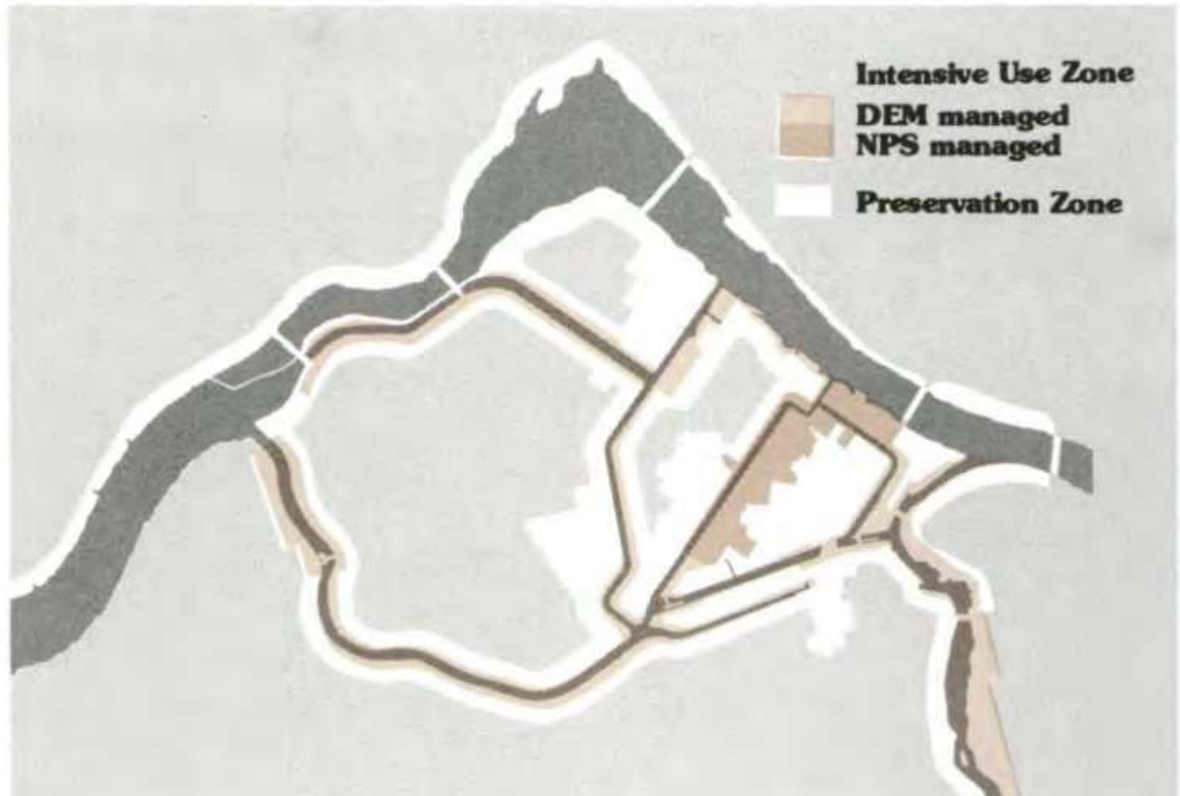
In 1975, the Lowell Historic Canal District Commission (LHCDC) was established by Congress to prepare a plan for the preservation and interpretation of Lowell's historic resources in and around the Lowell canal system. The *1977 Report of the LHCDC* (commonly referred to as the “Brown Book”) produced the legislation that was passed by Congress in 1978 and signed into law by President Carter. This law established a two-tiered federal involvement: the LNHP acting as a unit of the NPS, and the Lowell Historic Preservation District (LHPD or the District)—administered by a commission under the Department of the Interior.

The *1977 Report of the LHCDC* proposed the creation of LNHP and presented the approach to developing the Lowell canal system and surrounding areas as a national park. The LHCDC stated that the key to development of the LNHP was a cooperative undertaking of the NPS and the Massachusetts Department of Environmental Management, the agency now known as MADCR. This partnership would “share state and federal resources, maximizing the effectiveness and abilities of each.” Given the dense urban setting, it was understood that almost all the structures would remain in private ownership, but the structures would be developed and managed by NPS and MADCR (LHCDC 1977, p. 46). The authors further elaborated that “the NPS would develop an overall interpretive program and restore certain buildings and settings. The State would preserve the canal system and develop its recreational potentials.” The specific responsibilities of each agency as identified in the *1977 Report of the LHCDC* are outlined below in Table 5-1 and Figure 5-1.

Table 5-1. Agency Responsibilities Identified in 1977 Report of the LHCDC

Agency	Responsibilities
NPS	interpretation, park wide downtown "cross-section" of 19th Century Lowell (including preservation, building and open space improvements, transportation and visitor services)
MADCR	canals, riverbanks, and related recreational areas gatehouses, locks and dams barge system

Figure 5-1. LNHP Management Responsibility Zones



Within the intensive use zone, both NPS and MADCR were tasked with acquiring and improving property, as well as developing and operating the major visitor attractions in the LNHP. The costs of park development, management, and maintenance would be shared on a *pro rata* basis between NPS and MADCR (LHCDC 1977). Additionally, the plan elaborated on the supportive involvement of local government, whose efforts in preservation in the downtown and elsewhere would dovetail in the LNHP.

In 1980, the *Preservation Plan* and *Details of the Preservation Plan* were published by the LHPC (LHPC 1980a; LHPC 1980b). *Details of the Preservation Plan* specified the roles of NPS, the Commonwealth of Massachusetts (acting through MADCR), and the City of Lowell. LNHP was to rehabilitate certain gatehouses and perform exterior façade improvements, among other tasks. MADCR's role was to acquire all or portions of the Lowell canal system, including the interpretive and recreational water access rights, and "also undertake the landscaping, repair and maintenance of all the basic canal structural components, canal related structures and canal related land for recreational use." The City of Lowell was to implement certain downtown street and pedestrian improvements, such as exposures of cobblestone streets, bricking, and paving of sidewalks.

In August 1981, NPS developed and issued the FGMP to provide a basis for visitor use, resource management, and general development within the LNHP. The FGMP states management of the Lowell canal system will be accomplished through cooperative agreements between private and public entities, but MADCR is the lead agency

responsible for maintaining, developing, and renovating the major elements of the canal system (NPS 1981). Proprietors, the owner of most of the Lowell canal system at the time, was responsible for the maintenance and operation of the hydromechanical components.

The Preservation Plan Amendment was released in 1990 (LHPC 1990). This plan presented NPS and MADCR as the lead parties responsible for preservation and maintenance of the Lowell canal system. The report stated that “Boott uses canal water to generate hydropower and performs all maintenance tasks directly related to that end. This includes keeping up machinery like control gates and turbines located at various points along the system.” The *Preservation Plan Amendment* acknowledged that MADCR has the right to maintain and repair canal walls.

The conceptual framework for the rights and responsibilities for management of the Lowell canal system remain consistent within the *1977 Report of the LHDC*, the 1980 *Details of the Preservation Plan*, the 1981 FGMP, and the 1990 *Preservation Plan Amendment*. MADCR and NPS are presented as the main parties responsible for developing, renovating, and maintaining the major elements of the canal system. As discussed in the following sections, this collaborative approach to management of the Lowell canal system was solidified with a succession of legal documents exchanging property, easement rights, and resource rights.

5.2 Ownership of the Lowell Canal System

On January 16, 1984, the *Great Deed* was executed between Proprietors, Boott Mills⁵, and Boott, and through this deed a considerable portion of the Lowell canal system was conveyed to Boott. Notably, certain portions or resources that were not conveyed to Boott in the 1984 *Great Deed* were later obtained by MADCR through the December 1, 1986 *Order of Taking*, or remain under the legal ownership of Proprietors. Notably, these documents also issued ownership of lands and structures not located within the current FERC Project boundary and therefore outside the scope of this report. The following text describes the ownership of structures within the current FERC Project boundary. The structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.1 Pawtucket Dam

According to the 1984 *Great Deed*, the Pawtucket Dam is owned by Boott in its entirety and any and all equipment and mechanisms located in or on said dam or appurtenant thereto including fishways (Appendix B, p. 2).

5.2.2 Pawtucket Canal

According to the 1984 *Great Deed* and the 1986 *Order of Taking*, the length of the Pawtucket Canal and Lower Pawtucket Canal are currently owned by the Proprietors, including the canal walls (to the exterior planes), beds, and bottoms (Appendix B, p. 2, 4-5). As described below, structures and fixtures within the Pawtucket Canal have mixed ownership, with certain structures being jointly or independently owned by Proprietors and MADCR. Boott is not known to have legal ownership of any structures of or within the Pawtucket Canal. The boundaries of ownership of the Pawtucket Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.2.1 Francis Gatehouse

The Francis Gatehouse, also known as the Great Gate Gatehouse, is owned in part by MADCR and Proprietors. It is part of the Guard Lock and Gates facility and houses the Great Guard Gate. Proprietors owns all buildings, structures, and fixtures of the Francis Gatehouse below an elevation of 106.2 ft Mean Sea Level (MSL). MADCR owns all buildings, structures, and fixtures associated with the Francis Gatehouse above 106.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Francis

⁵ Boott Mills was organized in the State of Massachusetts on May 29, 1964 and was the original co-Licensee of the Project with Proprietors. Boott Mills operated the downtown mill powerhouses before the Project was transferred to Boott in December 1984.

Gatehouse used in the ongoing maintenance and operation of hydroelectric power generation above 106.2 ft MSL are owned by Proprietors (Appendix C, p. 20; Appendix B, p. 2, 4-5).

5.2.2.2 Hydraulic Gatehouse

The Hydraulic Gatehouse, also known as the Guard Locks Gatehouse, is owned in part by MADCR and Proprietors. It is also part of the Guard Lock and Gates facility and houses the five headgates which control flow into the Pawtucket Canal. Proprietors owns all buildings, structures, and fixtures of the Hydraulic Gatehouse below an elevation of 88.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Hydraulic Gatehouse above 88.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Hydraulic Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 88.2 ft MSL are owned by Proprietors. (Appendix C, p. 20; Appendix B, p. 2, 4-5).

5.2.2.3 Guard Locks Locking Gatehouse

The Guard Locks Locking Gatehouse is owned in part by MADCR and Proprietors. It is also part of the Guard Lock and Gates facility. Proprietors owns all structures and fixtures of the Guard Locks Locking Gatehouse below an elevation of 99.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Pawtucket Gatehouse above 99.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Guard Locks Locking Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 99.2 ft MSL are owned by Proprietors. (Appendix C, p. 21; Appendix B, p. 2, 4-5).

5.2.2.4 Guard Locks Lock Chambers

The Guard Locks Lock Chambers, also known as the Lower Locking Gate, are owned by Proprietors (Appendix C, p. 21; Appendix B, p. 2, 4-5).

5.2.2.5 Swamp Locks Gatehouse

The Swamp Locks Gatehouse is owned in part by MADCR and Proprietors. Proprietors owns all structures and fixtures of the Swamp Locks Gatehouse below an elevation of 89.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Swamp Locks Gatehouse above 89.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Swamp Locks Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 89.2 ft MSL are owned by Proprietors. (Appendix C, p. 16; Appendix B, p. 2, 4-5).

5.2.2.6 Swamp Locks Dam (North)

The Swamp Locks Dam (North) is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in the 1984 *Great Deed*. Similarly, MADCR did not acquire legal ownership of the Swamp Locks Dam (North) in the 1986 *Order of Taking* (Appendix C, p. 16-17).

5.2.2.7 Swamp Locks Dam (South)

The Swamp Locks Dam (South) is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in the 1984 *Great Deed*. Similarly, MADCR did not acquire legal ownership of the Swamp Locks Dam (South) in the 1986 *Order of Taking* (Appendix C, p. 17-18).

5.2.2.8 Lower Locks Gatehouse

The Lower Locks Gatehouse is owned in part by MADCR and Proprietors. Proprietors owns all structures and fixtures of the Lower Locks Gatehouse below an elevation of 74.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Lower Locks Gatehouse above 74.2 ft MSL, with the exception of structures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Lower Locks Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 74.2 ft MSL are owned by Proprietors (Appendix C, p. 24; Appendix B, p. 2, 4-5).

5.2.2.9 Lower Locks Lock Chamber

The Lower Locks Lock Chamber is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in 1984. Similarly, MADCR did not acquire ownership of the Lower Locks Lock Chamber in the 1986 *Order of Taking* (Appendix C, p. 24-25).

5.2.2.10 Lower Locks Dam

The Lower Locks Dam is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in 1984. Similarly, MADCR did not acquire ownership of the Lower Locks Dam in the 1986 *Order of Taking* (Appendix C, p. 24-25).

5.2.2.11 Assets Power Station

Hydropower and generating equipment associated with Assets Power Station is owned by Boott, including all turbines, generators, governors, exciters, control panels, main

breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with Assets Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstock feeding the units of Assets Power Station is owned by Proprietors (Appendix B, p. 8).

The tailrace from Assets Power Station discharging into the Pawtucket Canal is owned by Proprietors (Appendix B, p. 8).

5.2.3 Northern Canal

The Northern Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Northern Canal was conveyed to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Northern Canal have mixed ownership, with certain structures being jointly or independently owned by Proprietors, Boott, and MADCR. The boundaries of ownership of the Northern Canal structures discussed below are depicted in Appendix A, Appendix E, and the associated GIS database.

5.2.3.1 Pawtucket Gatehouse

The Pawtucket Gatehouse (also known as the Northern Canal Gatehouse) is owned in part by MADCR and Boott. Boott owns all structures and fixtures of the Pawtucket Gatehouse below an elevation of 101.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Pawtucket Gatehouse above 101.2 ft MSL, with the exception of any structures needed for ongoing hydroelectric power generation. The fixtures and equipment of the Pawtucket Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 101.2 ft MSL are owned by Boott. (Appendix C, p. 11; Appendix B, p. 2-3).

5.2.3.2 Pawtucket Gatehouse Lock Chamber

The Pawtucket Gatehouse Lock Chamber above an elevation of 82.7 ft MSL was expressly reserved from conveyance to Boott in the 1984 *Great Deed* (Appendix B, p. 3), and remains under the legal ownership of Proprietors.

5.2.3.3 Northern Canal Waste Gatehouse

The Northern Canal Waste Gatehouse is owned in part by Proprietors and MADCR. The Northern Canal Waste Gatehouse was expressly reserved (without limitation) from conveyance to Boott in the 1984 *Great Deed* (Appendix B, p. 5). In the 1986 *Order of Taking*, MADCR obtained ownership of all buildings, structures, and fixtures associated with the Northern Canal Waste Gatehouse above 92.2 ft MSL, with the exception of any fixtures and equipment used in the ongoing maintenance and operation of hydroelectric

power generation (Appendix C, p. 15). The fixtures and equipment of the Northern Canal Waste Gatehouse used for ongoing maintenance and operation above 92.2 ft MSL are owned by Proprietors.

5.2.3.4 HydroLocks

The lock and control structure located at the bend of the Northern Canal was constructed by and is owned by Boott.

5.2.3.5 Great River Wall

The Great River Wall was expressly reserved from conveyance to Boott in the 1984 *Great Deed*, and remains under the legal ownership of Proprietors. The Great River Wall is the left retaining wall of the Northern Canal. It runs 2,485 feet from the Pawtucket Gatehouse to a natural rock outcrop upstream of the E.L. Field Powerhouse (Appendix B, p. 5; Appendix C, p. 13-15).

5.2.3.6 Northern Canal Walkway

The Northern Canal Walkway runs atop the Great River Wall for most of its length. The portion of the Northern Canal Walkway atop the Great River Wall is owned by Proprietors as a part of the Great River Wall. The westmost portion of the Northern Canal Walkway that diverts off the Great River Wall and extends into the Northern Canal Island (Parcel 29-B in Appendix A) is owned by MADCR.

5.2.4 Western Canal

The Western Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*, including the lower portion also known as the Lawrence Canal. The Western Canal was conveyed in its entirety to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Western Canal have mixed ownership, with certain structures being jointly or independently owned by Boott and MADCR. The boundaries of ownership of the Western Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.4.1 Tremont Gatehouse

The Tremont Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Tremont Gatehouse below an elevation of 90.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Tremont Gatehouse above 90.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Tremont Gatehouse used for ongoing maintenance and operation of

hydroelectric power generation above 90.2 ft MSL are owned by Boott. (Appendix C, p. 7; Appendix B, p. 2-3).

5.2.4.2 Lawrence Dam

The Lawrence Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks. Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks. (Appendix B, p. 2-3).

5.2.4.3 Hall Street Dam

The Hall Street Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks. Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks (Appendix B, p. 2-3).

5.2.5 Merrimack Canal

The Merrimack Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Merrimack Canal was conveyed in its entirety to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Merrimack Canal have mixed ownership, with certain structures being jointly or independently owned by Proprietors, Boott, and MADCR. The boundaries of ownership of the Merrimack Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.5.1 Merrimack Gates

The Merrimack Gates are owned by Boott and includes all appurtenant equipment or mechanisms. Said gates were transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks. (Appendix B, p. 2-3).

5.2.5.2 YMCA Gates

The YMCA Gates are owned by Boott, and includes all appurtenant equipment or mechanisms (Appendix B, p. 2-3).

5.2.5.3 Moody Street Feeder Gatehouse

The Moody Street Feeder Gatehouse is owned in part by NPS and Boott. Structures of the Moody Street Feeder Gatehouse above an elevation of 92.2 ft MSL were expressly reserved from conveyance in the 1984 *Great Deed* (Appendix B, p. 3). In July 2001, NPS purchased Moody Street Feeder Gatehouse (above an elevation of 92.2 ft MSL) from Proprietors. Boott owns all structures and fixtures of the Moody Street Feeder Gatehouse below an elevation of 92.2 ft MSL. The structures and equipment of the Moody Street Feeder Gatehouse used for ongoing maintenance and operation of hydroelectric power are owned by Boott (Appendix B, p. 2-3).

5.2.5.4 Moody Street Feeder

The Moody Street Feeder is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks (Appendix B, p. 2-3).

5.2.6 Eastern Canal

The Eastern Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Eastern Canal was conveyed in its entirety to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Eastern Canal have mixed ownership, with certain structures being jointly or independently owned by Boott and MADCR. The boundaries of ownership of the Eastern Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.6.1 Massachusetts Wasteway Gatehouse

The Massachusetts Wasteway Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Massachusetts Wasteway Gatehouse below an elevation of 80.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Massachusetts Wasteway Gatehouse above 80.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Massachusetts Wasteway Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 80.2 ft MSL are owned by Boott (Appendix C, p. 7; Appendix B, p. 2-3).

5.2.6.2 Boott Dam Gatehouse

The Boott Dam Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Boott Dam Gatehouse below an elevation of 74.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Boott Dam Gatehouse above 74.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures

and equipment of the Boott Dam Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 74.2 ft MSL are owned by Boott. (Appendix C, p. 7; Appendix B, p. 2-3).

5.2.6.3 Boott Dam

The Boott Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks. Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks (Appendix B, p. 2-3).

5.2.6.4 Rolling Dam Gatehouse (North)

The Rolling Dam Gatehouse (North) is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Rolling Dam Gatehouse (North) below an elevation of 83.7 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Rolling Dam Gatehouse (North) above 83.7 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Rolling Dam Gatehouse (North) used for ongoing maintenance and operation of hydroelectric power generation above 83.7 ft MSL are owned by Boott (Appendix C, p. 29; Appendix B, p. 2-3).

5.2.6.5 Rolling Dam Gatehouse (South)

The Rolling Dam Gatehouse (South) is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Rolling Dam Gatehouse (South) below an elevation of 83.7 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Rolling Dam Gatehouse (South) above 83.7 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Rolling Dam Gatehouse (South) used for ongoing maintenance and operation of hydroelectric power generation 83.7 ft MSL are owned by Boott (Appendix C, p. 29; Appendix B, p. 2-3).

5.2.6.6 Rolling Dam

The Rolling Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks (Appendix B, p. 2-3). Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks.

5.2.6.7 Boott Penstock

The Boott Penstock from the Eastern Canal to the Merrimack Canal is owned by MADCR (Appendix C, p. 9).

5.2.6.8 Merrimack Dam

The Merrimack Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks (Appendix B, p. 2-3).

5.2.6.9 John Street Power Station

Hydropower and generating equipment associated with John Street Power Station is owned by Boott, including all turbines, generators, governors, exciters, control panels, main breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with John Street Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstocks feeding the units of John Street Power Station are owned by Proprietors (Appendix B, p. 8).

The tailrace from John Street Power Station discharging into the Merrimack River is owned by Proprietors (Appendix B, p. 8).

5.2.6.10 Bridge Street Power Station

Hydropower and generating equipment associated with Bridge Street Power Station (Section 8) is owned by Boott, including all turbines, generators, governors, exciters, control panels, main breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with Bridge Street Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstocks feeding the units of Bridge Street Power Station are owned by Proprietors (Appendix B, p. 8).

The tailrace from Bridge Street Power Station discharging into the Concord River is owned by Proprietors (Appendix B, p. 8).

5.2.7 Hamilton Canal

The Hamilton Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Hamilton Canal was conveyed in its entirety to the exterior plane of the canal walls,

and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Hamilton Canal have mixed ownership, with certain structures being jointly or independently owned by Boott and MADCR. The boundaries of ownership of the Hamilton Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.7.1 Hamilton Gatehouse

The Hamilton Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Hamilton Gatehouse below an elevation of 90.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Hamilton Gatehouse above 90.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Hamilton Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 90.2 ft MSL are owned by Boott (Appendix C, p. 9; Appendix B, p. 2-3).

5.2.7.2 Hamilton Power Station

Hydropower and generating equipment associated with Hamilton Power Station is owned by Boott, including all turbines, generators, governors, exciters, control panels, main breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with Hamilton Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstocks feeding the units of Hamilton Power Station are owned by Proprietors (Appendix B, p. 8).

The tailrace from Bridge Street Power Station discharging into the Pawtucket Canal is owned by Proprietors (Appendix B, p. 8).

5.3 Easement Rights to the Lowell Canal System

On January 16, 1984, the *Great Deed* was executed between Proprietors, Boott Mills, and Boott, and through this deed various easement rights were conveyed to Boott. Additionally, MADCR later obtained easement rights to the canal system through the December 1, 1986 *Order of Taking*, and NPS obtained easement rights in the 1995 *Grant of Easement*. The following text describes the easement rights to the structures within the canal system based on an analysis of the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*. Notably, these three documents issued easements and rights that are not associated with lands and structures located within the current FERC Project boundary, therefore these are excluded from discussion in this report. The structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.1 Pawtucket Canal

The 1984 *Great Deed* conveyed to Boott an easement to the Pawtucket Canal and Lower Pawtucket Canal. This easement was granted in common with Proprietors for the right to install conduits, pipes, and wiring, and the right to maintain, repair and replace the canal walls (Appendix B, p. 4-5).

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all Pawtucket and Lower Pawtucket Canal walls, beds or bottoms, and to all dams and lock chambers located in the canals, for the following purposes (Appendix C, p. 33):

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construction and maintenance of improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Pawtucket Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Pawtucket Canal walls, beds or bottoms for purposes a-i listed

above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Pawtucket Canal precede the rights of all other parties. Boott and Proprietors have the right, in common with each other, to install conduits, pipes, and wiring, and to maintain, repair, and replace the Pawtucket Canal walls. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Pawtucket Canal.

As described below, structures and fixtures within the Pawtucket Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.1.1 Francis Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Francis Gatehouse. Said easement consists of the exclusive right of operation and controlling the Francis Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Francis Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Francis Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Francis Gatehouse, structures, and fixtures, as well as the right to access the Francis Gatehouse (Appendix C, p. 20).

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements such as walkway surfaces, lighting, railings, decking benches, and landscaping, and any other uses consistent with park uses (Appendix D, p. 2).

5.3.1.2 Hydraulic Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Hydraulic Gatehouse. Said easement consists of the exclusive right of operation and controlling the Hydraulic Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Hydraulic Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Hydraulic Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Hydraulic Gatehouse, structures, and fixtures, as well as the right to access the Hydraulic Gatehouse (Appendix C, p. 20).

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements such as walkway surfaces, lighting, railings, decking benches, and landscaping, and any other uses consistent with park uses (Appendix D, p. 2).

5.3.1.3 Guard Locks Locking Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Guard Locks Locking Gatehouse. Said easement consists of the exclusive right of operation and controlling the Guard Locks Locking Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Guard Locks Locking Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Guard Locks Locking Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements such as walkway surfaces, lighting, railings, decking benches, and landscaping, and any other uses consistent with park uses (Appendix D, p. 2).

5.3.1.4 Guard Locks Lock Chambers

MADCR has permanent and exclusive rights to the Guard Locks Lock Chambers for purposes a-i listed above in Section 5.3.1.

5.3.1.5 Swamp Locks Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Swamp Locks Gatehouse. Said easement consists of the exclusive right of operation and controlling the Swamp Locks Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Swamp Locks Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Swamp Locks Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Swamp Locks Gatehouse, structures, and fixtures, as well as the right to access the Swamp Locks Gatehouse (Appendix C, p. 16).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Swamp Lock Gatehouse (Appendix D, p. 3).

5.3.1.6 Swamp Locks Dam (North)

As understood based on a review of the described documents, Boott has the rights, in common with Proprietors, to install conduits, pipes, and wiring. Boott has the right to maintain and operate Swamp Locks Dam (North) (Appendix B, p. 4-5).

Additionally, MADCR has permanent and exclusive easement rights to Swamp Locks Dam (North) and all Pawtucket Canal walls, beds or bottoms for purposes a-i listed above in Section 5.3.1, provided those purposes do not interfere with Boott's use of the structure for hydroelectric power generation. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at Swamp Locks Dam (North) precede the rights of all other parties, including the land and/or property owner. All other property rights not mentioned reside with Proprietors, the present owner of the Pawtucket Canal and Swamp Locks Dam (North) (Appendix C, p. 16-17; Appendix B, p. 2, 4-5).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Swamp Locks Dam (North) (Appendix D, p. 3).

5.3.1.7 Swamp Locks Dam (South)

As understood based on a review of the described documents, Boott has the rights, in common with Proprietors, for the uninterrupted flowage of water past Swamp Locks Dam (South), as well as the rights to install conduits, pipes, and wiring. Boott has the right to maintain and operate Swamp Locks Dam (South) (Appendix B, p. 4-5).

Additionally, MADCR has permanent and exclusive easement rights to Swamp Locks Dam (South) and all Pawtucket Canal walls, beds or bottoms for purposes a-i listed above in Section 5.3.1, provided those purposes do not interfere with Boott's use of the structure for hydroelectric power generation. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at Swamp Locks Dam (South) precede the rights of all other parties, including the land and/or property owner. All other property rights not mentioned reside with Proprietors, the present owner of the Pawtucket Canal and Swamp Locks Dam (South) (Appendix C, p. 17-18; Appendix B, p. 2, 4-5).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Swamp Locks Dam (South) (Appendix D, p. 3).

5.3.1.8 Lower Locks Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Lower Locks Gatehouse. Said easement consists of the exclusive right of operation and controlling the Lower Locks Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Lower Locks Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Lower Locks Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Lower Locks Gatehouse, structures, and fixtures, as well as the right to access the Lower Locks Gatehouse (Appendix C, p. 16).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Lower Locks Gatehouse (Appendix D, p. 3).

5.3.1.9 Lower Locks Lock Chamber

MADCR has permanent and exclusive rights to the Lower Locks Lock Chamber for purposes a-i listed above in Section 5.3.1.

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Lower Locks Lock Chamber (Appendix D, p. 3).

5.3.1.10 Lower Locks Dam

As understood based on a review of the described documents, Boott has the rights, in common with Proprietors, to install conduits, pipes, and wiring. Boott has the right, in common with Proprietors, to maintain and operate Lower Locks Dam (Appendix B, p. 4-5).

Additionally, MADCR has permanent and exclusive easement rights to Lower Locks Dam and all Pawtucket Canal walls, beds or bottoms for purposes a-i listed above in Section 5.3.1, provided those purposes do not interfere with Boott's use of the structure for hydroelectric power generation. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at Lower Locks Dam precede the rights of all other parties, including the land and/or property owner. All other property rights not mentioned reside with Proprietors, the present owner of the Pawtucket Canal and Lower Locks Dam (Appendix C, p. 24-25; Appendix B, p. 2, 4-5).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Lower Locks Dam (Appendix D, p. 3).

5.3.1.11 Assets Power Station

In the 1984 *Great Deed*, Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of Assets Power Station from the Merrimack Canal, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott also obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Pawtucket Canal, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.3.2 Northern Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in the Northern Canal for the following purposes (Appendix C, p. 33):

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construct and maintain improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Northern Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Northern Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Northern Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Northern Canal.

As described below, structures and fixtures within the Northern Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.2.1 Pawtucket Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Pawtucket Gatehouse. Said easement consists of the exclusive right of operation and controlling the Pawtucket Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Pawtucket Gatehouse. Boott has the right to access Pawtucket Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Northern Canal walls, beds or bottoms for support of the Pawtucket Gatehouse, structures, and fixtures, as well as the right to access the Pawtucket Gatehouse (Appendix C, p. 16). MADCR also obtained an exclusive and permanent easement to the Pawtucket Gatehouse Wall and Lock Chamber for purposes a-i listed above in Section 5.3.2, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.2.2 Pawtucket Gatehouse Lock Chamber

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to the Pawtucket Gatehouse Lock Chamber for purposes a-i listed above in Section 5.3.2, provided that such activities do not interfere with Boott's hydroelectric power production.

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements of the Pawtucket Gatehouse Lock Chamber (Appendix D, p. 2).

5.3.2.3 Northern Canal Waste Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Northern Canal Waste Gatehouse. Said easement consists of the exclusive right of operation and controlling the Northern Canal Waste Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Northern Canal Waste Gatehouse. Boott has the right to access Northern Canal Waste Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Northern Canal walls, beds or bottoms for support of the Northern Canal Waste Gatehouse, structures, and fixtures, as well as the right to access the Northern Canal Waste Gatehouse (Appendix C, p. 15).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Northern Canal Waste Gatehouse (Appendix D, p. 3).

5.3.2.4 Great River Wall

The 1984 *Great Deed* conveyed to Boott an easement for the right to maintain real and personal property of the Great River Wall. Said easement consists of the exclusive right of operation and controlling the Great River Wall, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms of the Great River Wall. Boott, in common with Proprietors, has the right to access Great River Wall for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent and exclusive easement in the Northern Canal walls, beds or bottoms, to implement any of the purposes a-i listed above in Section 5.3.2.

NPS has secured easements for improvements to the walkway and installation of railings and ramps, and rights acquired include a right to install, maintain or remove boat docking, railings, fencing, curbing, paving, lighting, landscaping, signs, walkway; and a right to access for above.

5.3.2.5 Northern Canal Walkway

The 1986 *Order of Taking* conveyed to MADCR a permanent and exclusive easement to the Northern Canal Walkway to implement any of the purposes a-i listed above in Section 5.3.2.

NPS has secured easements for improvements to the walkway and installation of railings and ramps, and rights acquired include a right to install, maintain or remove boat docking, railings, fencing, curbing, paving, lighting, landscaping, signs, walkway; and a right to access for above.

5.3.3 Western Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in the Western Canal for the following purposes (Appendix C, p. 33):

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construction and maintenance of improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Western Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Western Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Western Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Western Canal.

As described below, structures and fixtures within the Western Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.3.1 Tremont Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Tremont Gatehouse. Said easement consists of the exclusive right of operation and controlling the Tremont Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Tremont Gatehouse. Boott has the right to access Tremont Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Western Canal walls, beds or bottoms for support of the Tremont Gatehouse, structures, and fixtures, as well as the right to access the Tremont Gatehouse (Appendix C, p. 26).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Tremont Gatehouse (Appendix D, p. 3).

5.3.3.2 Lawrence Dam

MADCR obtained an exclusive and permanent easement to the Lawrence Dam for purposes a-i listed above in Section 5.3.3, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.3.3 Hall Street Dam

MADCR obtained an exclusive and permanent easement to the Hall Street Dam for purposes a-i listed above in Section 5.3.3, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4 Merrimack Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all Merrimack Canal walls, beds or bottoms, and to all dams and lock chambers located in the canals, for the following purposes (Appendix C, p. 33):

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construction and maintenance of improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Merrimack Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Merrimack Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Merrimack Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Merrimack Canal.

As described below, structures and fixtures within the Pawtucket Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.4.1 Merrimack Gates

MADCR obtained an exclusive and permanent easement to the Merrimack Gates purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4.2 YMCA Gates

MADCR obtained an exclusive and permanent easement to the YMCA Gates purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4.3 Moody Street Feeder Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Moody Street Feeder Gatehouse. Said easement consists of the exclusive right of operation and controlling the Moody Street Feeder Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Moody Street Feeder Gatehouse. Boott has the right to access Moody Street Feeder Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

MADCR obtained an exclusive and permanent easement to the Moody Street Feeder Gatehouse for purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4.4 Moody Street Feeder

MADCR obtained an exclusive and permanent easement to the Moody Street Feeder for purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5 Eastern Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in the Eastern Canal for the following purposes (Appendix C, p. 33):

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Eastern Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Eastern Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Eastern Canal.

As described below, structures and fixtures within the Eastern Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.5.1 Massachusetts Wasteway Gatehouse

Through the 1986 *Order of Taking*, MADCR obtained a permanent easement in the canal walls, beds, and bottoms for support of the Massachusetts Wasteway Gatehouse, as well as any structures or fixtures of the Massachusetts Wasteway Gatehouse.

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Massachusetts Wasteway Gatehouse (Appendix D, p. 3).

5.3.5.2 Boott Dam Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Boott Dam Gatehouse. Said easement consists of the exclusive right of operation and controlling the Boott Dam Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Boott Dam Gatehouse. Boott has the right to access Boott Dam Gatehouse for repair and

installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Eastern Canal walls, beds or bottoms for support of the Boott Dam Gatehouse, structures, and fixtures, as well as the right to access the Boott Dam Gatehouse (Appendix C, p. 26).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Boott Dam Gatehouse (Appendix D, p. 3).

5.3.5.3 Boott Dam

MADCR obtained an exclusive and permanent easement to the Boott Dam for purposes a-i listed above in Section 5.3.5, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5.4 Rolling Dam Gatehouse (North)

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Rolling Dam Gatehouse (North). Said easement consists of the exclusive right of operation and controlling the Rolling Dam Gatehouse (North), and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Rolling Dam Gatehouse (North). Boott has the right to access Rolling Dam Gatehouse (North) for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Eastern Canal walls, beds or bottoms for support of the Rolling Dam Gatehouse (North), structures, and fixtures, as well as the right to access the Rolling Dam Gatehouse (North) (Appendix C, p. 7).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Rolling Dam Gatehouse (North) (Appendix D, p. 3).

5.3.5.5 Rolling Dam Gatehouse (South)

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Rolling Dam Gatehouse (South). Said easement consists of the exclusive right of operation and controlling the Rolling Dam Gatehouse (South), and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Rolling Dam Gatehouse (South). Boott has the right to access

Rolling Dam Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Eastern Canal walls, beds or bottoms for support of the Rolling Dam Gatehouse (South), structures, and fixtures, as well as the right to access the Rolling Dam Gatehouse (South) (Appendix C, p. 7).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Rolling Dam Gatehouse (South) (Appendix D, p. 3).

5.3.5.6 Rolling Dam

MADCR obtained an exclusive and permanent easement to the Rolling Dam for purposes a-i listed above in Section 5.3.5, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5.7 Boott Penstock

Boott holds a permanent easement to the Boott Penstock to flow water together with the right to repair and replace said penstock and the right of access (Appendix C, p. 9).

5.3.5.8 Merrimack Dam

MADCR obtained an exclusive and permanent easement to the Merrimack Dam for purposes a-i listed above in Section 5.3.5, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5.9 John Street Power Station

In the 1984 *Great Deed*, Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of John Street Assets Power Station from the Eastern Canal and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Merrimack River, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.3.5.10 Bridge Street Power Station

In the 1984 *Great Deed*, Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of Bridge Street Power Station

from the Eastern Canal, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott also obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Concord River, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.3.6 Hamilton Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in said canal and not otherwise noted for the following purposes (Appendix C, p. 33):

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Hamilton Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Hamilton Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Hamilton Canal.

As described below, structures and fixtures within the Hamilton Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.6.1 Hamilton Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Hamilton Gatehouse. Said easement consists of the

exclusive right of operation and controlling the Hamilton Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Hamilton Gatehouse. Boott has the right to access Hamilton Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Hamilton Canal walls, beds or bottoms for support of the Hamilton Gatehouse, structures, and fixtures, as well as the right to access the Hamilton Gatehouse (Appendix C, p. 16).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Hamilton Gatehouse (Appendix D, p. 3).

5.3.6.2 Hamilton Power Station

In the 1984 *Great Deed*, Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of Hamilton Power Station from the Hamilton Canal, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott also obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Concord River, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.4 Resource Rights in the Lowell Canal System

Boott reviewed many sources to understand the resource rights to the Lowell canal system, including planning documents, the MOU, the 1984 *Great Deed* between Proprietors and Boott (Appendix B), the 1986 *Order of Taking* (Commonwealth of Massachusetts 1986), and the 1995 *Grant of Easement* (Appendix D).

For this study, resource rights are classified as such if they are owned by or issued to a party independently from any physical structure. The ownership and rights of physical resources, such as the canal system and gatehouses, are not discussed in this section because those rights are limited to specific structures and thus are addressed above in Sections 5.2 and 5.3.

5.4.1 Recreational Resource Rights of the Lowell Canal System

The 1977 *Report of the LHDC* and the 1980 *Details of the Preservation Plan* indicated the Commonwealth agreed to preserve the canal system and develop its recreational potentials. The Commonwealth would also undertake the landscaping, repair and maintenance of all the basic canal structural components, canal related structures and canal related land for recreational use. By letter to dated May 14, 1980, MADCR stated that they were currently in the process of negotiating purchase rights to the Lowell canal system which would allow for recreational boating in the canals, stating further that use of the canals and implementation of the boating program were key elements of the Lowell Heritage State Park (Commonwealth 1980).

Through the 1986 *Order of Taking*, MADCR purchased “the exclusive right to use water in the entire canal system and the Merrimack River for recreational, educational, and navigational purposes” and the purposes shall be non-consumptive with respect to Boott’s hydroelectric generation (Appendix C). Included in the 1986 *Order of Taking* is a permanent and exclusive easement to MADCR for all canal walls, beds, or bottoms throughout the canal system for purposes consistent with the use of the canal system as a recreational park. These purposes specifically include placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature (Appendix C). The 1995 *Grant of Easement* from MADCR to LNHP did not convey these exclusive recreation rights to LNHP, but does allow LNHP to hold boat tours through certain segments of the canal system (Appendix D).

The 1990 *Preservation Plan Amendment* stated this about recreational resources of the canal system:

“In general, water taxis, dinner boats, and other organized boating programs will be encouraged, subject to permission from the Heritage State Park [MADCR] which controls recreational boating rights on the canals.”

In 1991, MADCR, the NPS, and Boott executed the MOU, which specifically identifies recreational resource rights as residing with MADCR, further stating MADCR was to “act

on all special use permit requests for the recreational use of the Lowell canal system and provide copies of approved permits to Boott Hydro and Proprietors and the NPS.”

Conceptual planning documents, legal ownership and easement documents, as well as the MOU, are all consistent regarding recreational resource rights. MADCR owns exclusive rights to use the entire canal system for recreational, educational, and navigational purposes. MADCR holds an exclusive and permanent easement for placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature.

5.4.2 Air Resources of the Lowell Canal System

The 1986 *Order of Taking* transferred to MADCR “all air rights over the canals, including the canal walls and any dams thereon” (Appendix C).

5.4.3 Water and Flowage Resource Rights of the Lowell Canal System

Boott obtained water and flowage rights in the 1984 *Great Deed*. These rights include all riparian rights, water rights and mill rights of the canal system, for the uninterrupted flowage of water through the canals. Other uses of water in the Lowell canal system (e.g., surface water recreation) shall be non-consumptive with respect to hydroelectric generation except for reasonable amounts to operate locking gates. Proprietors retains the right to use up to 100 cfs of water from the canals for fire protection and process water (Appendix B; Appendix C).

5.4.4 Power Production

Included in the 1984 *Great Deed* is a conveyance from Proprietors to Boott stating that the land, easements, equipment, and rights are conveyed together with all necessary rights and easements for the purpose of utilizing the facilities, equipment, and fixtures for the purpose of producing and selling power. This includes the right to construct, reconstruct, modify, and rehabilitate such facilities, equipment, and fixtures and to install additional facilities, equipment, and fixtures of like purpose as are necessary, with the right to utilize the premises, structures, facilities, waterways, and equipment to their maximum potential for the purpose of power (Appendix B, p. 9). This is a resource right granted to Boott independently of its rights to specific structures.

5.5 Historical Management Agreements

There are two known historical management agreements between the parties with interests in the Lowell canal system. While these agreements have expired, they present an understanding between the parties of what their individual roles and responsibilities were regarding the Lowell canal system. Given the collaborative approach to ownership and easement rights to the Lowell canal system, the two agreements provide the best insight into delegation of regular management tasks such as ground maintenance, water levels, waterborne trash, and vegetation management.

Following establishment of the LNHP in 1978, MADCR, NPS, and Proprietors entered into an agreement in 1979 regarding management of the Lowell canal system. This agreement establishes MADCR as the lead party responsible for the maintenance of canal structural components, including canal banks and walls. As the lead party, MADCR was responsible for “landscaping and damage repair” to canal banks and walls, with assistance provided by NPS if needed. NPS was charged with the operation of the canal-related exhibits and services, and Locks and Canals (i.e., Proprietors and ultimately Boott) were responsible for the operation and maintenance of Pawtucket Dam and other hydromechanical parts of the Lowell canal system (NPS 1981). This agreement is presented below as Figure 5-2 and fully published in the 1981 FGMP.

Figure 5-2. 1979 Canal System Management Agreement

APPENDIX D: AGREEMENTS BETWEEN MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND NATIONAL PARK SERVICE CONCERNING CANAL USE, DEVELOPMENT, AND MANAGEMENT

<u>Acquisition</u>	<u>Lead Agency</u>
Canal Banks and Walls (variable boundary)	DEM
Gatehouses (11)	DEM assisted by NPS
Locks (2 single and 2 double)	DEM
Dam	Locks and Canals
Interpretive Water Access Rights/Recreational Boating	DEM
Water Use Rights/Hydro	NPS assisted by DEM
Bridges	DEM and City of Lowell
Canal Boats - 8 to 40 person capacity	Preservation Commission and NPS
<u>Development</u>	<u>Lead Agency</u>
Canal Banks and Walls (landscaping and damage repair)	DEM assisted by NPS
Locks	DEM/NPS
Gatehouses	DEM/NPS
Dam	Locks and Canals
Bridges	DEM/City of Lowell (DEM will coordinate, funding to be determined)
Barge Landings	DEM/NPS
Displays and Signs	DEM/NPS (joint effort prior to 4/80)
<u>Maintenance</u>	<u>Lead Agency</u>
Canal Banks and Walls	DEM
Locks	DEM
Gatehouses	DEM and Locks and Canals
Dam	Locks and Canals
Bridges	DEM/City of Lowell
Dredging/Debris Removal	DEM (initially NPS)
Barge Landings	NPS/DEM (Francis Gate, Northern Canal)
Boats	NPS
Water Flow Levels	NPS/Locks and Canals
Maintenance Staff	DEM or contractual arrangement
<u>Visitor Services (4-month operation)</u>	<u>Lead Agency</u>
Overall Cooperative Lead Agency	NPS
Interpretive Staffing	NPS/DEM
Boat Operators (16)	NPS
Security	NPS

In 1991, MADCR, the NPS, and Boott executed the MOU for the purpose of maintaining and operating the Lowell canal system.⁶ The MOU was generated after the 1984 *Great Deed* and 1986 *Order of Taking*, and so it best represents an agreement between the parties of what their legal roles and responsibilities were. The MOU assigned specific responsibilities to each party and was filed with the Commission on April 25, 1991 (MOU 1991). The MOU included a provision expiring the agreement five years from the date of signing, with the option for renewal.

Article I of the MOU states that the agreement shall not diminish the rights and interests acquired by MADCR in the 1986 *Order of Taking*. The agreement shall not release or further bind Boott and Proprietors from their obligations under the FERC license or other obligations to maintain the Lowell canal system.

Article II of the MOU directs Proprietors to maintain the structural integrity of the walls, bottoms, and dam structures of the Pawtucket Canal to the extent they have the duty to do so as owner. Proprietors was to provide MADCR with any plans to alter the Pawtucket Canal and to obtain MADCR's written prior approval.

Article III of the MOU discusses the responsibilities of Boott, which includes maintaining canal walls, beds, bottoms, and dam structures to the extent they have a duty to do so as the owner. Article III(C) requires Boott to operate the canal system to provide the appropriate flows and water levels. Articles III(H-I) require Boott to obtain written approval from MADCR regarding any changes to the Gatehouses or canal walls which may affect the historic fabric of the system. Other article provisions require notification of drawdowns, access to the E.L. Field Powerhouse, and the payment of utility costs (heating and gas).

Article IV directed NPS to assist MADCR in the removal of litter and other waterborne trash from the Lowell canal system, and states NPS is responsible for maintaining and cleaning ("including removal of trash") all existing trash booms and safety lines/booms on the Lowell canal system. Article IV of the MOU directed NPS to assist MADCR in the removal and control of vegetation along the canal system, ("particularly that growing on and in the canal walls") and to assist MADCR in performing ground maintenance. NPS was tasked with assisting MADCR with the repair and maintenance of all historic gatehouses, such as the repair of architectural features, cleaning and repair of roof gutters, and the maintenance of locking gates and other mechanical devices.

Responsibilities assigned to MADCR under Article V of the MOU include routine maintenance of the gatehouses, serving as the lead agency for all grounds maintenance, keeping all grass, trees, and shrubs neatly trimmed and in a healthy condition, removing dead or diseased plants, fertilizing, pruning, and thinning of plants (as required), and approving ground maintenance or improvement plans as proposed by NPS. Article V directs MADCR to assist NPS in the removal and control of destructive vegetation along

⁶ Proprietors of the Locks and Canals on the Merrimack River was included as a party in the MOU but did not execute the agreement.

the canal system, and to cooperate with the NPS on developing a litter removal program for waterborne litter and trash on the canals. (MOU 1991). MADCR was to implement an annual safety inspection of the locking gates and gate chambers. This article also specified MADCR to reimburse NPS for time and materials for work done on the canal system. Notably, MADCR was to “act on all special use permit requests for the recreational use of the Lowell canal system and provide copies of approved permits to Boott Hydro and Proprietors and the NPS.”

Article VI of the MOU directed NPS and MADCR to hold a joint annual meeting to develop an annual building maintenance program, annual destructive vegetation clearing program and canal surface water cleanup program. The annual programs were to be developed in accordance with each agency’s budget and seasonal staffing level. Under Article VI, MADCR was also directed to consult with NPS to develop a long-term capital improvement program for the canal system. The minutes of this annual meeting between MADCR and NPS were to be provided to Boott and the Proprietors each year (MOU 1991).

5.6 FERC Jurisdiction

One of the goals for this study was to clarify FERC jurisdiction. Section 23(b)(1) of the Federal Power Act (FPA) requires that each non-federal hydroelectric project, except those with pre-1920 federal permits that are still valid, falls under FERC jurisdiction if it: (1) is located on navigable waters of the United States; (2) occupies lands of the United States; (3) uses surplus water or water power from a government dam; or (4) is located on a body of water over which Congress has Commerce Clause jurisdiction, was constructed or modified after August 25, 1935, and affects interstate or foreign commerce.

All hydropower projects deemed jurisdictional must be licensed by FERC (or exempted from licensure), and the Project Boundary defines the geographical limits of FERC's jurisdiction. The Commission determines the limits of the Project Boundary based on lands and waters needed by the Licensee: (1) to construct and operate its Project and (2) to carry out other non-power project purposes such as fish passage and minimum flow requirements.

The Licensee is required to manage operations within the Project Boundary in accordance with the conditions set forth in the FERC license. Additionally, Section 10(c) of the FPA requires Licensees with to maintain the project works within the Project Boundary in a condition of repair adequate for the purposes of navigation and for the efficient operation of said works in the development and transmission of power, . . . to maintain and operate said works as not to impair navigation, and . . . conform to such rules and regulations as the Commission may from time to time prescribe for the protection of life, health, and property.

The FERC Project Boundary around the project impoundment, continuous project features, and noncontiguous Project works are presented in Exhibit G maps according to the methods required under 18 CFR §4.41(h)(2). The Exhibit G maps for the Lowell Hydroelectric Project were filed with the FLA on April 30, 2021.

As stated in the FLA, Boott proposes to remove the four mill power stations and associated canal infrastructure from the new FERC license. The Project Boundary will be modified to remove much of the downtown canal infrastructure. However, Boott will continue to manage the canal structures, water levels and flows using best practices and consistent with current agreements with the NPS and other stakeholders.

6 Discussion and Conclusion

6.1 Ownership and Easement Rights to the Lowell Canal System

Ownership, easement rights, and use of the canal system in Lowell are complex, with intersecting roles between public agencies and private entities at the local, State, and Federal level. In their request for this study, NPS noted that the eventual goal of this study would be to denote which entity is ultimately responsible for specific resources. Boott's review of the documentation indicated that it is not possible to specify ultimate responsibility for most physical resources of the Lowell canal system because the LNHP was planned, designed, and launched as a collaboration between parties, and legal documents were executed to solidify this approach. From the start of the park's conception in the 1977 *Report of the LHCD*, the vision has always been "a creative partnership which would go beyond the reach of any single agency or level of government" (LHCD 1977). Generally, the legal documentation issued in the form of the 1984 *Great Deed*, 1986 *Order of Taking*, and the 1995 *Grant of Easement* does not designate any party to be solely responsible for specific structures.

Ownership of the Lowell canal system is largely determined by the 1984 *Great Deed* and 1986 *Order of Taking*. Components of the canal system are owned by Proprietors, Boott, and MADCR. Proprietors owns much of the Pawtucket Canal and structures of the Pawtucket Canal. Boott owns the Northern Canal, Western Canal, Merrimack Canal, Eastern Canal, and Hamilton Canal. Boott owns specific dams, lock structures, and hydroelectric equipment within the canals they own, and this is largely determined based on elevation. MADCR owns most of the gatehouses and several other historical structures throughout the Lowell canal system.

Easement rights to structures of the Lowell canal system are held by Proprietors, Boott, MADCR, and NPS. In the 1984 *Great Deed*, Boott obtained easement rights, in common with Proprietors, to the Pawtucket Canal and structures of the Pawtucket Canal. These easement rights allow Boott to access, operate, maintain, repair, and replace the Pawtucket Canal and structures of the Pawtucket Canal. In the 1986 *Order of Taking*, MADCR obtained a permanent and exclusive easement to structures of the canal system, including canal walls, beds, and bottoms, for purposes including conservation, preservation, maintenance, and other uses consistent with the use of the system as a park. NPS obtained similar easement rights through the 1995 *Grant of Easement* from MADCR, including the right to maintain, repair, conduct grounds maintenance, and operate boat tours.

Most structures throughout the canal system have overlapping ownership and easement rights. A property owner (Proprietors, Boott, and/or MADCR) has a duty to achieve a reasonable standard of care⁷ for the properties under their ownership. Each property

⁷ The Standard of Reasonable Care is typically defined as the degree of caution and concern for the safety of self and others that a reasonable person would exhibit.

owner has a right to conduct routine maintenance of their facilities to achieve a standard of reasonable care, but they do not have an obligation to enhance or upgrade their properties. Similarly, a maintenance easement issued in common with others allows the holder to conduct routine maintenance of the property under easement, and allows others holding to also conduct routine maintenance, but the easement holder(s) is not required or permitted to upgrade or enhance the property.

An exclusive easement allows the easement owner to control and implement specific purposes as if they are the owner. MADCR has a permanent and exclusive easement over most of the canal system for the following purposes, which include enhancements and upgrades:

- a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
- b) Preservation and conservation;
- c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
- d) Landscaping and erection of exhibits and structures;
- e) Placement of barriers and fences;
- f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
- g) Placement of lighting and other utilities;
- h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- i) Any and all other uses consistent with the operation of the canal system as a park.

Given that MADCR's exclusive easement is throughout most of the canal system, it overlaps significantly with Boott and Proprietors' owned property. It is understood that Boott, Proprietors, and MADCR have a duty and right to maintain properties under their ownership to achieve a standard of reasonable care. Owners do not have an obligation or duty to upgrade or enhance their property. However, MADCR's exclusive easement throughout most of the Lowell canal system gives them the right to implement any of the purposes noted above, which include enhancements and upgrades, as if they were the owner. Accordingly, in cases of overlapping ownership and easement rights, it will almost entirely depend on the nature of the effort to determine obligations and responsibilities.

6.2 Resource Rights to the Lowell Canal System

For this study, resource rights were classified as such if they are owned by or issued to a party independently from any physical structure. Four resource rights were identified based on a review of the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*.

Recreational resource rights are exclusively owned by MADCR. In early conceptual planning documents, MADCR was presented as the party that would own, implement, and manage any recreational resources. MADCR obtained such rights in the 1986 *Order of Taking*, including the exclusive right to use water for recreational, educational, or navigational purposes, and permanent and exclusive rights to build wharves, docks, and boat ramps. The 1990 *Preservation Plan Amendment* and the 1991 MOU, both issued after MADCR received all recreation rights, discuss MADCR's role as encouraging, managing, and approving different recreational activities throughout the Lowell canal system.

Air resource rights have been owned by MADCR since issuance of the 1986 *Great Deed*. Water and flowage rights are owned by Boott and Proprietors, as established in the 1984 *Great Deed*.

Additionally, as stated in the 1984 *Great Deed*, Boott was granted the right to utilize structures of the canal system to their maximum potential for the purpose of power, a resource right granted to Boott independently of its rights to specific structures.

6.3 Historical Management Agreements

There are two known historical management agreements between the parties with interests in the Lowell canal system. The two agreements provide the best insight into delegation of regular management tasks such as grounds maintenance, water levels, waterborne trash, and vegetation management.

The 1979 agreement states that NPS and MADCR were responsible for development and maintenance of canal walls and banks, including landscaping and repair and dredging/debris removal, as well as developing locks, gatehouses, bridges, barge landings, and displays and signs. Proprietors (ultimately Boott) were responsible for development and maintenance of the Pawtucket Dam, water levels and flows, and gatehouses.

The 1991 MOU was executed between MADCR, the NPS, and Boott. As owners of the canal walls, the MOU directed Proprietors and Boott to maintain the structural integrity of the walls, bottoms, and dam structures to the extent they have the duty to do so as owner (maintain a standard of reasonable care). Proprietors and Boott were to provide MADCR with any plans that might alter the historic fabric of the canal system, and to obtain MADCR's written prior approval. Boott was directed to operate the canal system to provide the appropriate flows and water levels.

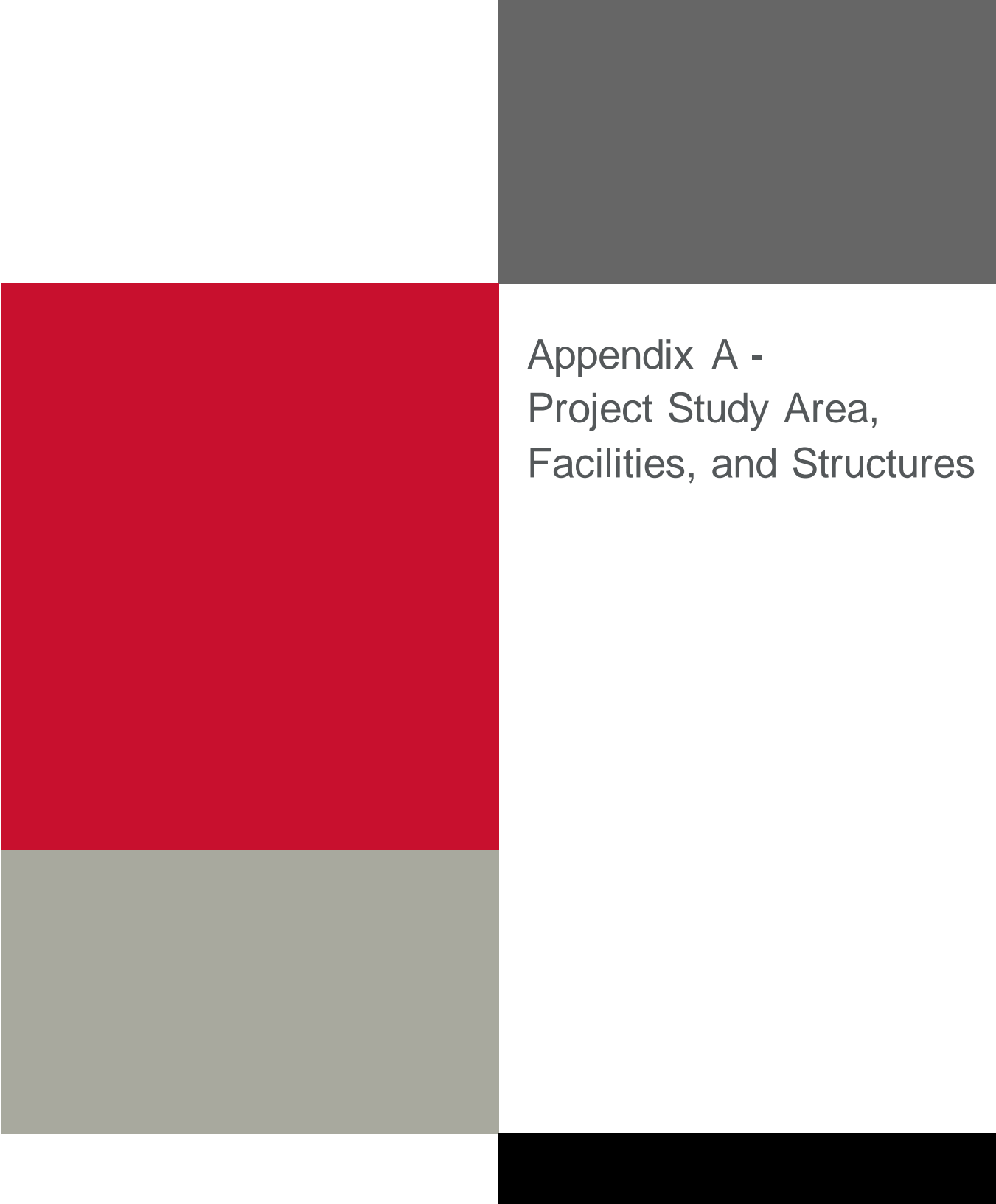
The MOU directed NPS and MADCR to collaborate on most daily, routine management tasks regarding the Lowell canal system. They were to remove litter and other waterborne trash from the Lowell canal system, and maintain and clean all existing trash booms and safety lines/booms on the Lowell canal system. NPS and MADCR were directed to hold a joint annual meeting to develop an annual building maintenance program, annual destructive vegetation clearing program (“particularly that growing on and in the canal walls”) and canal surface water cleanup program. NPS was tasked with assisting MADCR with the repair and maintenance of all historic gatehouses, such as the repair of architectural features, cleaning and repair of roof gutters, and the maintenance of locking gates and other mechanical devices.

7 Variances from FERC-Approved Study Plan

The Resources, Ownership, Boundaries, and Land Rights Study was conducted in full accordance with the methods described in the FERC-approved study plan.

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Appendix A - Project Study Area, Facilities, and Structures



Appendix B -
1984 *Great Deed*



Appendix C -
1986 *Order of Taking*



Appendix D – 1995 *Grant
of Easement*



Appendix E – GIS Database Exported Maps