

Cochituate Aqueduct,
Brookline Reservoir Gatehouse
Boylston and Warren Sts.
Brookline
Norfolk County
Massachusetts

HAER MA-32

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA
PHOTOGRAPHS

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

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COCHITUATE AQUEDUCT, BROOKLINE RESERVIOR GATEHOUSE

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Date: 1848

Location: Boylston and Warren Sts. Brookline, Norfolk County,
Massachusetts.

Engineer: John B. Jarvis and E.S. Chesborough.

Significance: The Cochituate Aqueduct was Boston's first major water supply conduit. Completed in 1848, the 15-mile conduit from Lake Cochituate to the Brookline Reservoir was linked to cast iron pipes at this gatehouse. Of all the surviving structures on the aqueduct, the gatehouse was the most architecturally elaborate. Granite quoins, a heavy belt course, and a gable pediment frame the two-story street facade of the granite ashlar building.

Transmitted by: Dan Clement, 1984. Historical information written by Peter Stott.

ADDENDUM TO:
COCHITUATE AQUEDUCT, BROOKLINE RESERVOIR
GATEHOUSE
Water Supply System of Metropolitan Boston
Boylston & Warren Streets
Brookline
Norfolk County
Massachusetts

HAER MA-32
HAER MASS,11-BROK,4-

PHOTOGRAPHS

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1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

COCHITUATE AQUEDUCT, BROOKLINE RESERVOIR
(Lower or Principal Gatehouse of the Cochituate Aqueduct)

This report is an addendum to the one-page summary report previously transmitted to the Library of Congress, exclusive of cover sheets for earlier sets of the documentation.

Location: Warren and Boylston streets, Brookline, Norfolk County, Massachusetts.

The coordinates for the Cochituate Aqueduct, Brookline Reservoir Gatehouse are -71.133226 W and 42.32847 N, and they were obtained through Google Maps in August 2013 with, it is assumed, NAD 1983. There is no restriction on the release of the locational data to the public.

Significance: The lower gatehouse of the Cochituate Aqueduct sits at the edge of the Brookline reservoir and is the frontispiece to Boston's first public water system. The Cochituate Aqueduct is also the second municipal aqueduct built in the United States. The architect Charles E. Parker designed the gatehouse, but it was engineers John Bloomfield Jervis, who designed the Croton Aqueduct in New York and worked on the construction of the Erie Canal, and Ellis Sylvester Chesbrough, who would go on to develop Chicago's water supply system, to whom the credit for the waterworks belongs. Likely it was Chesbrough who called for the gatehouse's "iron roof" to be made.

An elegant statement of a public work and civic body politic, the two-story building made of granite walls and covered by a wrought iron plate roof system invited Bostonians in through an arched doorway. Upon entering the building, they gazed through the axial opening and were confronted by the 26' wall holding back the 120 million-gallon reservoir. Looking down they could see the three pipes that fed water to the city proper. To either side of the vestibule rose cast-iron stairs with ornamental piercing, a simple balustrade, a continuous stringer, and non-slip patterns on the treads. Complimenting the significance of the engineering of the waterworks and craftsmanship of the ornamental cast-iron steps, the wrought iron roof system is a rare and important survivor. The development of wrought iron and its influence on architecture and architectural ornament makes the extant truss and stitch-riven plate roofing as significant as the civil engineering and urban planning effort that the aqueduct system represents.

Date: 1847-48.

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Description: The gable-roofed Lower or Principal Gatehouse of the Cochituate Aqueduct faces northeast to Warren and Boylston streets and is two-stories at that elevation; the rear (southwest) of the gatehouse backs into the embankment of the reservoir and is one-story in height and three bays across. The main entrance is from the northeast on street level, while a secondary entrance to the upper (gate control) level is at the west end of the northwest side elevation. The main entrance is a central door placed between sepulchral niches. Banded columns flank the door and rise to support the lintel that together form an ornamental surround. Fenestration in the sides and rear elevations is distinguished by voussoir arches. A beltcourse wraps the building and becomes a plinth in the rear or reservoir side of the gatehouse. There is a full pediment on the front elevation, while the partial return of the eaves at the rear (southwest) elevation hints at the classical pediment in keeping with the Italian Palazzo aesthetic chosen for the signature buildings of the public works.

In addition to the Cochituate gatehouses on the lake and reservoir was the Beacon Hill Reservoir constructed in 1849. The Beacon Hill Reservoir was much admired for its “simplicity and forthright use of granite.” This 190’ x 126’ building with its arched elevations was likely designed and erected under William Whitwell’s supervision. The builders were Charles G. Chase and Samuel Farwell. It fell victim to another civic initiative and was removed during the expansion of the State House in 1888.¹ Nonetheless, the architectural and engineering references made through the waterworks system to Rome highlighted Bostonians’ embrace of representative government and a monumentalism representing those civic ideals.

The foundations are made of granite and brick, while the interior walls are of made of hard-fired bricks laid in Rosendale cement, and the exterior walls are made of granite and accentuated at the corners with quoins. The durability of materials and use of hydraulic Rosendale cement prolonged the life of the building and protected it from the stresses of the freeze-and-thaw cycles. The interior was plastered with a cove softening the transition from wall to ceiling. The upper level has a temporary plywood floor; that of the stair is granite. The upper level was heated with a coal stove and the pipe outlet was cut into the rear wall. Light from the windows illuminated the building.

¹ Walter H. Kilham, *Boston After Bulfinch: An Account of its Architecture* (Cambridge: Harvard University Press, 1946), 39-41, quotation, 40.

The bulkhead chamber of the lower level extends under stair vestibule to the front foundation wall. Three pipes fed water from the reservoir to the city of Boston. These pipes are visible in the bulkhead chamber as is the 26' wall holding 120 million gallons of the Brookline Reservoir back. This bulkhead wall is also the east end of a series of screening chambers where the water was filtered through a succession of grates and gates as it moved from the distribution chamber into the inlet openings through the guard chambers to the regulating chambers to the final chambers and out through the water mains. Valve-like gates screened and controlled the flow of water through the chambers and into the cast iron pipes; the gates functioned much like canal locks, sliding vertically and moved up and down by brass screws. Water pressure effectively sealed the gates in place when they were lowered into position. The water pipes had conventional valves or stop-cocks positioned just below, or after they left, the gatehouse. A by-pass aqueduct fed into a cross distribution chamber from the north; the cross distribution chamber was created by removing the walls between the three regulating chambers. The by-pass proved to be too small and its connection into the gatehouse sealed with brick masonry.

Upstairs, one-third of the floor space was over the open or grated water-filled chambers. Originally finely finished, evidence of the plaster cove ceiling and grained woodwork survives near one window opening. This level of refinement corresponds to the quality of building materials used throughout the aqueduct system and is part of the architectural program selected to represent the city and reflect well upon it.

Connecting the floor levels are two staircases made of cast iron. The stairs are ornamental and the first to have continuous stringers. The delicate piercing of the cast iron is reminiscent of that seen in the Boston Athenaeum at the same time and the manufacturer of those stairs was the firm Smith and Lovett. The firm's niche was architectural iron. The ends and risers are unified castings, while the treads with a non-slip pattern on each are independent. The stairs consist of an upper and lower straight run, joined by winders in a ninety-degree turn, and have plain balustrade. The balustrade looks like the railing seen in the Inlet Gatehouse at Lake Cochituate.

The roof system anticipates a modern light-weight, mass produced truss and its manufacture of wrought iron was innovative at the time. There are twenty-one wrought iron trusses placed 24" on center and spanning 23'0". All of the connections are single rivets. The original roof was also made of wrought iron, in sheets 1/16" thick, that was tarred and painted. The sheets were stitch riveted

together and were secured to the trusses by riveted clips. This roof was covered by a standing seam metal roof, which in turn leaked.

History:

The Cochituate Aqueduct stretches for fifteen miles from Lake Cochituate in Natick to the reservoir in Brookline, and three above-ground features define its path: the Inlet Gatehouse on the lake, the bridge across the Charles River, and the Lower or Principal Gatehouse on the Brookline Reservoir. A gravity-fed system, the aqueduct relied on the difference in grade from the originating lake and the various distribution reservoirs in the city of Boston. Inverted siphons and pressure-containing iron pipes carried the water over the Charles River. The gradual change was about three and one-half inches per mile and the water primarily flowed through various tunnels and under-ground conduits. The scale of the tunnels allowed for maintenance inspections by boat and permitted the flow of ten million gallons of water a day. The Brookline Reservoir was also planned as a settling basin and held a two-week reserve of water in the event the aqueduct had to be closed. Engineers broke ground for the aqueduct in October 1846 and two years later the city of Boston held its “grand water celebration” on the Common.

Despite the monumental accomplishment of the Cochituate Aqueduct as a public work and the commitment to public good it signified, the needs of the city soon demanded further improvements and so the waterworks system was expanded. In 1870 a larger reservoir on Chestnut Hill came on-line, and its basins flanked the Cochituate Aqueduct. Water from the Cochituate flowed into the Chestnut Hill reservoir, as well as waters from other sources, and soon a line was added to connect Chestnut Hill directly to the three pipes fed by the Brookline Reservoir (and seen in the Lower or Principal Gatehouse bulkhead chamber). Once this water main was complete, the Brookline Reservoir was bypassed. It remains as a back-up water source. By the century’s end the Metropolitan Water Works and Sewerage Board acquired elements of the Boston water system outside the city limits and in 1903 the city of Boston sold the Brookline section of the Cochituate Aqueduct and the Brookline Reservoir to the town of Brookline for \$150,000. The entire Cochituate Aqueduct cost \$1,720,000 to build in 1848, and in 1903, the Brookline component became a park. The fence erected around the reservoir initially was removed.

In 1926 the town of Brookline modified the Lower or Principal Gatehouse to support the recreational uses of the reservoir, such as swimming and skating. Bathrooms were added, with a men’s bathroom installed over the south stair and a women’s bathroom inserted near the lower run of the north stair. Flooring over the south stair and the removal of the handrails created space for the men’s room; the pipes damaged the staircase. The lower run of the north stair was floored over

for the women's room. On the upper (gatehouse control room) level, flooring covered the screening chambers and the pedestals for operating the gates were taken out. Also removed from the floor were the railings around the chambers. With the cleared space, partitions for changing rooms were likely installed.

In the 1950s the "Sportsmen's Club of Brookline" moved into the gatehouse. It was a fishing club and the club "transformed" the interior by redecorating and installing electric lights. The club also affixed the sign over the main entrance at this time. By the 1970s club activity ceased and the gatehouse went largely unused. A decade later the interior gutter system failed and water damage compromised the ends of the trusses. This led to the loss of the interior plasterwork and half of the wood doors and windows. The flooring added in 1926 fell into the wet chambers and a plywood floor was installed to cover the chambers. The doors and window openings were similarly secured. In 2008 the gutters were covered and water redirected away from the building thus stabilizing the structure and the oldest extant wrought iron roof.

Historian: Virginia B. Price, 2013.

Project

Information: This short form report was prepared from materials provided by the Preservation Division of the Town of Brookline's Department of Planning and Community Development and by the Metropolitan Waterworks Museum, and from the extensive research done by Dennis DeWitt, in advance of a hoped-for, larger documentation project to map the aqueduct system. Materials include the nomination for the Massachusetts Historical Commission and the drawings for the HSR as well as Dennis DeWitt's essay that delves into the history, technology and context for the Cochituate Aqueduct. I thank Dennis especially and also Roger Reed, Jean Innamorati, and Greer Hardwicke for sharing their expertise and enthusiasm for the Cochituate Aqueduct with me.

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Figure 1. Area map to show the Cochituate Aqueduct and the upper and lower (principal) gatehouses. Map courtesy of Matthew Stutts, CRGIS, 2013.

