

NEW YORK STATE BARGE CANAL, LOCK E5
(Erie Canal, Lock E5)
55 Flightlock Road
Waterford
Saratoga County
New York

HAER NY-376
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

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NEW YORK STATE BARGE CANAL, LOCK E5 (Erie Canal, Lock E5)

HAER No. NY-376

Location: 55 Flightlock Road, Waterford, Saratoga County, New York

Lock E5 is located at latitude: 42.8023602, longitude: -73.6965225. The point represents the lockhouse and was obtained in 2009. There is no restriction on its release to the public.

Significance: Lock E5, located on the Erie Canal, is significant as a component of the Waterford Flight of Locks, described as the “greatest series of high lift locks in the world” at the time of their construction.¹ The Waterford Flight of Locks is part of the nationally significant New York State Barge Canal.

Description: Lock E5 is the fourth lock in the Waterford Flight of Locks on the Erie Canal.² An asphalt parking area for the lock is located directly off Flightlock Road. A post-and-rail fence surrounds the nearby picnic area. The lock site consists of the lock and associated structures, powerhouse, lockhouse, and an earthen embankment dam with a bypass spillway.

The lock has a 33.2' lift to the west with normal pool elevations of 117.8' below and 151' above. There are double-leaf, steel miter lock gates at each end of the chamber, operated by spars and gear trains powered by the electric motors. The flow of water through the culverts in the chamber walls is controlled by valves also operated by the electric motors. Control stand shelters are located on the north side of the lock at both the upstream and downstream ends. These are single-story aluminum and steel enclosures with flat tops and Plexiglass panels that sit on concrete foundations. The shelters have sliding aluminum windows and steel and Plexiglass doors. Modern light fixtures illuminate the lock. An I-beam footbridge with an open-grate catwalk spans the chamber. The lock and control stand shelters are in good condition.

The powerhouse, located just off Flightlock Road to the north of the chamber, is a single-story concrete building with a hipped asphalt-covered roof. Wood entry doors with four-light transom windows provide access to the building. The fenestration consists of nine-over-nine-light wood windows with three-light windows in the eaves. The original motor-generator sets have been removed from the building, and an office now occupies the space. The bridge crane, however, is still extant. The powerhouse is in fair condition due to the poor condition of the roof and spalling concrete.

The lockhouse, which is also in fair condition, is located on the north side of the lock chamber. The single-story frame building sits on a concrete foundation and is clad in wood clapboard

¹ Noble Whitford, *History of the Barge Canal of New York State* (Albany: J.B. Lyon Company, Printers, 1922), 478.

² Description of current conditions is based on a site visit made by the HAER recording team in summer 2009.

siding. The gable roof is covered with asphalt shingles and has exposed rafter tails. The entrances are wood pane-and-panel doors with wood shed hoods. The fenestration consists of eight-over-eight-light windows and one storm window. The wood hopper windows are extant.

A series of guide walls between locks E4 and E5 help direct boats through the locks. The concrete guide walls are in good to fair condition, with some areas of spalling. The dock walls between locks E5 and E6 are concrete set on piers with several concrete-filled cast-iron bollards. The dock walls are in fair to poor condition with evidence of spalling and vegetation growth. The northeast guide wall and dock is concrete with severe spalling and breakage. The section nearest the lock gate is concrete clad in steel sheeting with cast-iron quarter-round coping. Concrete-filled cast-iron bollards and modern light fixtures line the wall. This section is in fair condition.

An earthen embankment with a concrete core forms a large pool between locks E5 and E6. There is a bypass channel paralleling the lock to the south, which is equipped with a concrete spillway at the west end. The stop-log section is built of welded steel and rubber with a valve at the end. The concrete platform has a pipe railing. The bypass and spillway empty into a natural bedrock channel. The spillway is in fair condition due to deteriorating concrete.

History: Building a canal west from the Hudson River in the Waterford area was challenging because of the Cohoes falls. As Noble Whitford describes it, prior surveys had located the route of the canal near the falls, but engineers discovered a land line from the Hudson to the Mohawk located 2-½ miles from the falls and quickly realized it provided the best route. To overcome the change in elevation, five locks separated by pools were necessary, creating the “greatest series of high lift locks in the world” with lifts ranging from 32.5' to 34.5' for a total of 169'. There were also bypass channels at all the locks as well as two guard gates at the end of what would become known as the Waterford Flight.³ The bypass channels were in place to regulate the flow of water into the pools separating the locks, thereby insuring ample water for lockage and minimizing the risk of flooding.⁴

Fort Orange Construction Company won Contract 11 to build Lock E5 and the spillway in May 1906. Excavation of the lock and core walls at the head of the lock was underway in 1907, and concrete work started in July. By the following year, the lock and core walls had been completed except for 600 cubic yards of the lock floor. The material excavated from Lock E6 was placed in the embankments around the walls of Lock E5 and the core walls at the head of the lock. During 1912, the contractor poured the concrete for the north core wall of the lock as well as the docks and walls between locks E5 and E6.⁵

³ Whitford, 477-79, quote from p. 478.

⁴ Michelle McFee, *A Long Haul: The Story of the New York State Barge Canal* (Fleischmanns, NY: Purple Mountain Press, 1998), 97-99.

⁵ *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1907, Vol. 1* (Albany: J.B. Lyon Company, 1908), 75; *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1908, Vol. 1* (Albany: J.B. Lyon Company, 1909), 79; *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1909, Vol. 1* (Albany: J.B. Lyon Company, 1910), 55; *Annual Report of the State Engineer and Surveyor of the*

The state made the completion of the Waterford Flight a priority in 1912 when “conditions of the work on other sections of the Erie Canal rendered it imperative that navigation be turned through the Waterford flight of locks in the spring of 1913.” The contract had been completed in April 1913 for \$1,217,100.⁶

The gates and lock valves were part of Contract No. 33, awarded to Penn Bridge Company on January 7, 1910, which encompassed the Waterford Flight. Work began on November 1, 1910, at Lock E2 and progressed along the flight. Installation of the guard and sluice gates started a month later, on December 1, 1910, and was completed by April 1, 1911.⁷

The power plant was included in Contract 92, awarded to MacArthur Bros. Co. & Lord Electric Co. in 1913. The contract specified the construction of a substation at Lock E5 to operate locks E4, E5, and E6. In 1914, the installation of the substation and equipment had been finished aside from testing and painting.⁸

Various repairs and alterations were made to Lock E5 after its completion. State funding was provided to supply and replace the lower lock gates, which was done under Contract M97, as well as lowering the sills of the lower set of gates, which was done under Contract US87. The work was necessary because in August 1949, the lower gates developed a leak after the miter posts failed, causing stress on the knee braces, end plates, and angles. As a result, navigation had to be suspended on the eastern end of the canal for ten days. In 1961, the lower gates were reinforced, reset, and refitted. There were still problems with these gates, however, and in 1980, they underwent rehabilitation again as part of Contract No. M80-6 (D96464). The entire lock was rehabilitated in 1990 under Contract D253479. Finally, in April 2006, new gates were installed at the lock. Each one measured 55' tall, 25' wide, and 2.5" thick and weighed 55 tons.⁹

Sources:

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1907, Vol. 1. Albany: J.B. Lyon Company, 1908.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1908, Vol. 1. Albany: J.B. Lyon Company, 1909.

State of New York for the Fiscal Year ended in September 30, 1912, Vol. 1 (Albany: J.B. Lyon Company, 1913), 76.

⁶ Quote from *Annual Report, 1912*, 76; *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1913, Vol. 1* (Albany: J.B. Lyon Company, Inc., 1914), 99.

⁷ *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1910, Vol. 1* (Albany: J.B. Lyon Company, 1911), 60; *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1911, Vol. 1* (Albany: J.B. Lyon Company, 1912), 48-49.

⁸ *Annual Report, 1913*, 136-37; *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1914, Vol. 1* (Albany: J.B. Lyon Company, 1915), 132.

⁹ State of New York, Department of Public Works, *Annual Report of the Superintendent for the Year 1949* (Albany: s.n., 1950), 125; State of New York, Department of Public Works, *Annual Report, 1960* (Albany: s.n., 1961), 77; State of New York, Department of Public Works, *Annual Report, 1961* (Albany: s.n., 1962), 76; Maintenance Contracts, 1980; 1990.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1909, Vol. 1. Albany: J.B. Lyon Company, 1910.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1910, Vol. 1. Albany: J.B. Lyon Company, 1911.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1911, Vol. 1. Albany: J.B. Lyon Company, 1912.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1912, Vol. 1. Albany: J.B. Lyon Company, 1913.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1913, Vol. 1. Albany: J.B. Lyon Company, Inc., 1914.

Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1914, Vol. 1. Albany: J.B. Lyon Company, 1915.

Hay, Duncan. "New York State Barge Canal." National Register of Historic Places Registration Form, 2014.

Maintenance Contracts, 1980; 1990.

McFee, Michelle. *A Long Haul: The Story of the New York State Barge Canal.* Fleischmanns, NY: Purple Mountain Press, 1998.

State of New York, Department of Public Works. *Annual Report of the Superintendent for the Year 1949.* Albany: s.n., 1950.

_____. *Annual Report, 1960.* Albany: s.n., 1961.

_____. *Annual Report, 1961.* Albany: s.n., 1962.

Whitford, Noble. *History of the Barge Canal of New York State.* Albany: J.B. Lyon Company, Printers, 1922.

Historians: Laura S. Black and Jami Babb, summer 2009

Project Information: The Historic American Engineering Record (HAER) is a long-range program that documents and interprets historically significant engineering sites and structures throughout the United States. HAER is part of Heritage Documentation Programs (Richard O'Connor, Manager), a division of the National Park Service, United States Department of the Interior. The New York State Barge Canal Survey was undertaken in summer 2009 in cooperation with the Erie Canalway National Heritage Corridor (ERIE), Beth Sciumeca,

Executive Director. Justine Christianson, HAER Historian, and Duncan Hay, ERIE, served as project leaders. The staff of the New York State Canal Corporation provided access to the sites. Craig Williams of the New York State Museum provided research materials and assistance. The HAER field team consisted of Jami Babb and Laura Black.

Appendix: Images of Current Conditions



Image 1: Downstream approach to Lock E5. Field photograph taken by HAER recording team, summer 2009.



Image 2: Powerhouse. Field photograph taken by HAER recording team, summer 2009.



Image 3: Stop-log section of the spillway. Field photograph taken by HAER recording team, summer 2009.