

NEW YORK STATE BARGE CANAL, LOCK E2
(Erie Canal, Lock E2)
South of the intersection of Broad and Fifth streets
Waterford
Saratoga County
New York

HAER NY-371
HAER NY-371

PHOTOGRAPHS

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

ADDENDUM TO:
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HAER No. NY-371

Location: South of the intersection of Broad and 5th streets, Waterford, Saratoga County, New York

Lock E2 is located at latitude: 42.7895443, longitude: -73.6819471. The point represents the lockhouse and was obtained in 2009. There is no restriction on its release to the public.

Significance: Lock E2, located on the Erie Canal, is part 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 a component of the nationally significant New York State Barge Canal.

Description: Located northwest of the junction of the Erie Canal and the Hudson River, this is the first lock of the Waterford Flight of Locks, which extend between locks E2 to E6.² Lock E2 is located south of an island, on the other side of which is the nineteenth-century “Waterford Side Cut” of the Champlain Canal and a lock (see HAER No. NY-14). A driveway crossing a modern concrete bridge spanning the Champlain Canal lock provides access to Lock E2. The bridge sits on concrete abutments resting on the nineteenth-century stone lock chamber walls. There is also a modern steel I-beam pedestrian bridge spanning this channel that has a pipe railing similar to that surrounding the lock chamber. The lock site consists of the lock and associated structures, lockhouse, and storage shed.

Lock E2 has a 33.5' lift with normal pool elevations of 15.20' below and 48.75' above. The east end of the north chamber wall is exposed, revealing twelve arches supporting the walkway and machinery. There are double-leaf, steel miter lock gates at each end of the chamber, operated by spars and gear trains powered by electric motors. The flow of water through the culverts in the chamber walls is controlled by valves also operated by electric motors. Control stand shelters are located at the upstream and downstream ends of the chamber. These consist of frame structures with horizontal wood siding, aluminum sliding windows, and a modern door. The shelters have asphalt shingle, pyramidal roofs. Modern chain-link fencing is attached to the lower sections of the pipe railings surrounding the lock, while modern light fixtures illuminate the site. The lock and control stand shelters are generally in good condition.

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 and historical maps from Series B1762, New York State Archives, Albany, New York. See “Eastern Division, Erie Canal, Section 1, Sta. 146 to Sta. 181,” approved March 29, 1922, 1, and “Eastern Division, Erie Canal, Section 1, Sta. 180 to Sta. 199,” approved March 29, 1922, 2.

The lockhouse and storage shed are located to the north of the chamber at the west end and are of similar construction. The modern stuccoed, one-story buildings have gable roofs covered in asphalt shingles. The buildings are accessed via pane-and-panel doors and are lit by one-over-one vinyl windows. They are both in good condition. There is no powerhouse at Lock E2 because it was served by the one at Lock E3.

The concrete approach and retaining walls are in good to fair condition.

A 1913 law required that the portion of the nineteenth-century Champlain Canal in this area be retained, and it serves as the spillway for the lock.³ The Champlain Canal remnant is lined with stone walls that are in good condition. A steel sheet-pile spillway at the inlet of this remnant is in good condition and helps regulate the pool level between locks E2 and E3. Sluice gates between the Champlain Canal alignment and the Erie Canal are in poor condition with only the concrete remnants visible. A modern pedestrian bridge also spans this alignment.

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 what Whitford stated was “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 bypass channels on what became known as the Waterford Flight of Locks as well as two guard gates.⁴ 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.⁵

The construction of Lock E2 was included in Contract 2, awarded April 3, 1905, to Ferguson Contracting Company. Originally, the contract had a completion date of July 1, 1907, but a supplementary agreement (Alteration No. 2) extended the completion date to November 1, 1908. Work had been partially delayed by a mandated increase in the width of locks from 28' to 45'. Ferguson Contracting Company spent the 1907 fiscal year dredging the lower approach to the lock and using the excavated material to create an embankment behind the south concrete retaining wall extending between locks E2 and E3. Concrete work started at the lock on September 12. The contractor built a central mixing plant and transported the concrete to the site in buckets loaded onto flat cars. By 1908, Ferguson Contracting Company had finished excavation of the lock, whose foundation sat on rock. The excavated material was placed on the south side of Lock E2 like the material dredged from the lower approach. By the end of the 1908

³ Whitford, 298-299.

⁴ Whitford, 477-479, quote from 478.

⁵ Michelle McFee, *A Long Haul: The Story of the New York State Barge Canal* (Fleischmanns, New York: Purple Mountain Press, 1998), 97-99.

fiscal year, Lock E2 was estimated to be 67 percent complete, with the outstanding work including the completion of the lock floor and the lower end of the north wall.⁶ Not only did Ferguson Contracting Company not complete the work by the deadline, but also the Canal Board ordered a suspension of the contract on May 13, 1909, because the company refused to continue operations and make changes in the plans. The incomplete work was consequently included in a new contract, 2-E, which was awarded to Holler & Shepherd. The excavation of the north wall of Lock E2 was completed as well as the concrete lock floor, retaining walls between the lock and the nearby Champlain Canal, and the retaining wall on the south side of the prism between the mixing plant and Lock E3.⁷

The gates and valves for the lock were part of Contract No. 33, awarded to the Penn Bridge Company on January 7, 1910. The contract also included the lock gates for contracts 2, 10, 11, and 15, as well as construction of the lock gates, valves, needle-beams, and guard gate on the Waterford Flight of Locks.⁸ Work began on November 1, 1910, at Lock 2 and progressed along the flight. Installation of the guard and sluice gates started exactly one month later and had been finished by April 1, 1911. The work at locks E2 and E3 was under the supervision of O. Hasbrouck and G.W. Stickney, both assistant engineers with the state.⁹

Contract 92 covered the power plant construction and installation of electrical equipment and machinery to operate and light the locks and guard gates at the Waterford Flight and Champlain Canal locks 6 and 8. The contract was let to McArthur Brothers & Lord Electric Company for \$1,178,976 on February 17, 1913. A substation at Lock E3 served both locks E2 and E3 and started operating on April 7, 1913. By 1914, the installation of gate and valve operating equipment, capstans, and light poles had been nearly completed.¹⁰

Repairs and alterations were made to the lock after its initial completion. In 1937, a new set of welded steel lock gates were built to replace the original wooden ones. The gates were 41'-7" tall and weighed 35 tons. The Syracuse shop built a duplicate set to replace the lower lock gates.¹¹

⁶ *Annual Report of the State Engineer and Surveyor of the State of New York for the Fiscal Year ended in September 30, 1906, Vol. 1* (Albany: J.B. Lyon Company, 1907); *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), 73-74; *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), 77-78.

⁷ *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), 53; *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), 57.

⁸ *Annual Report, 1910*, 60.

⁹ *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.

¹⁰ *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), 79; *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, 1914), 136; and *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.

¹¹ State of New York, Department of Public Works, *Annual Report of the Superintendent for the Year 1937* (Albany: J.B. Lyon Company, Printers, 1938), 19.

A number of repairs were undertaken at the lock in the 1940s. A leak next to Lock E2 required several repairs in 1941. The following year, new valves were installed. In addition, a leak between locks E2 and E3 had to be sealed with steel sheet piling and cinders. The lower lock gates were replaced in 1949 under Contract M97.¹²

Additional maintenance work took place in 1959 on the sills and gates under Contract US87. This may have been part of a larger initiative started in 1949 by the state's Department of Public Works to lower thirty-two lock sills to provide a minimum 13' depth and altering the lock gates to fit. Repairs were done at the lock in 1960-61, and the spillway was repaired under Contract M63-6 in 1963. In 1980, the lower lock gates were rehabilitated as part of Contract D96464 (also referred to as M80-6) and those at locks E3 and E5. The lock underwent an overhaul in 1989 under Contract D253021.¹³

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¹² State of New York, Department of Public Works, *Annual Report of the Superintendent for the Year 1941* (New York: Publishers Printing Company, 1942), 24; State of New York, Department of Public Works, *Annual Report of the Superintendent for the Year 1942* (Albany: Williams Press, Inc., 1943), 27; State of New York, Department of Public Works, *Annual Report of the Superintendent for the Year 1949* (Albany: s.n., 1950), 92-93; Maintenance Contracts, March 1, 1963.

¹³ Maintenance Contracts, August 17, 1966; 1980; 1989; *Annual Report, 1949*, 92-93; 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.

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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: Perspective view of lock gates and exposed exterior chamber wall. Field photograph taken by HAER recording team, summer 2009.



Image 2: View of nineteenth-century “Waterford Side Cut” with lock. Field photograph taken by HAER recording team, summer 2009.



Image 3: View of spillway. Field photograph taken by HAER recording team, summer 2009.