BALDWIN FILTRATION PLANT & RESERVOIR, FAIRMOUNT RESERVOIR
Bounded by Baldwin Street, Mt. Overlook Road, and Woodhill Road
Cleveland
Cuyahoga County
Ohio

HAER OH-3-A
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MIDWEST REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
601 Riverfront Drive
Omaha, NE 68102

HISTORIC AMERICAN ENGINEERING RECORD

BALDWIN FILTRATION PLANT & RESERVOIR

FAIRMOUNT RESERVOIR

HAER No. OH-3-A

Location:	Bounded by Baldwin Street, Mt. Overlook Road, and Woodhill Road Cleveland, Ohio UTM 17.449080.4593600, obtained from U.S.G.S. Shaker Heights Quadrangle Map, +/- 2 meters, August 29, 2009
Date of Construction:	1883-1885; upgraded with new gate houses ca. 1925
Architect/Engineers:	Unknown
Builders:	William McReynolds John Gawne and Sons
Present Owner:	City of Cleveland Division of Water
Present Use:	The surviving south basin is used to hold supernatant from the waste solids handling facilities built on the site of the reservoir's north basin in 1985.
Significance:	Put into service in 1885, the 80,000,000-gallon Fairmount Reservoir supplied water to the residents of Cleveland for 100 years. Its two stone-lined basins (only one of which survives) were built by skilled immigrants, and the reservoir's long service testifies to their superb craftsmanship.
Historian:	Carol Poh, August 2009
Project Information:	This documentation was prepared under contract with MWH Americas, Inc., program manager for the Plant Enhancement Program of the City of Cleveland Division of Water. This documentation supplements HAER-OH-3, titled "Division Avenue Pumping Station, Filtration Plant and the Baldwin Filtration Plant and Reservoir of the Cleveland Water Supply System," prepared by Ed Pershey in 1978 as part of the HAER Cleveland Survey, conducted in 1978-1979, and augmented by Carol Poh in 2005 and 2008. This documentation is available from the Library of Congress at: http://memory.loc.gov/ammem/collections/habs_haer.

DESCRIPTION

As built, the Fairmount Reservoir was an 80,000,000-gallon low-service reservoir. It was divided into two basins, north and south, separated by a narrow embankment. Irregular in plan, its overall dimensions were approximately 1371' long on the east, 459' long on the south, 576' long on the north, and 1550' long on the west. The elevation of the overflow of each basin was 170.3' above City Datum[1] and represented the height to which water may be put into the reservoir; when this elevation was reached, any surplus water overflowed to a sewer. The bottom elevation of the reservoir was 150.3' above City Datum. When water reached a depth of 20', the north basin had a capacity of 45,950,600 gallons; the south basin, 33,497,800, making the total capacity 80,448,400 gallons. A pair of inlet gate houses and a pair of outlet gate houses regulated the flow of water into and out of the reservoir.

The basins were excavated down to shale. On this shale base puddled clay was laid to a depth of 2.5', topped (on the basins' flat bottoms) by a 6" layer of sand, topped by a 4' layer of concrete. The sloped sides of the basins had the same depth of puddled clay, on top of which was laid a 6" layer of broken stone, topped by stone pavement.

Only the south basin survives. It measures 720' on the east, 459' on the south, 723' on the west, and 600' on the north. On the north bank, near the northwest corner of the basin, is a brick and stone (outlet) gate house reached by a plate girder bridge. The gate house has a hipped roof of slate, dressed stone foundation, and steel factory sash; inside are three valves and a half-ton crane. None of the equipment is in use. The bridge has stone veneer and a pipe railing.

The south basin is surrounded on three sides (all but the north) by an iron picket fence along the top of the embankments. It is reached from the extension of Woodhill Road, in front of the Fairmount Pumping Station, by a single-flight stairway with a decorative cast-iron railing that ends, top and bottom, in square newel posts. Near the base of the stairway is a large granite boulder inscribed "Wm. McReynolds, John Gawne & Sons, Contractors."

HISTORY

The city of Cleveland grew rapidly following the Civil War, requiring the continual expansion and extension of its water works. The Kentucky Reservoir, opened in 1856 on the city's near West Side, held only 6,000,000 gallons and was only 150' above City Datum in elevation. It was sorely inadequate twenty years later, and in the early 1880s plans were made to replace it

[1] City Datum is 2.34' above mean level of Lake Erie. Mean level of Lake Erie is 572.86' above mean sea level. "The City of Cleveland: A Short History and Illustrated Report of the Department of Public Utilities Consisting of the Division of Water and Heat and the Division of Light and Power, 1851-1931" (n.p., n.d.), 16.

with two new reservoirs located in the southeast part of the city: a low service reservoir (Fairmount) and a high service reservoir (Kinsman).

On February 6, 1883, John Whitelaw, superintendent and engineer of the Cleveland Water Works, reported to the City Council on the extension of the water supply:

> …a portion of the land has been obtained, by purchase, for the site of the proposed lower level reservoir, and legal proceedings have been instituted to procure the remainder of the land for both high and low service reservoirs, as proposed. Therefore … we hope during the ensuing season to contract for all of the work contemplated in the enlargement and extension of the works, so as to supply water to the higher portions of the city…

Whitelaw recommended contracts be let as follows: for a 36" main from Willson Avenue to the low service reservoir at Fairmount Street; for the 30" main from the high service pumping works to the high service reservoir; for the high service engine and boilers; for the extension of the boiler house at the old pumping works; for a ten million gallon pumping engine and three boilers for the low service pumping works, and, "as soon as plans and specifications can be prepared," for the construction of the high and low service reservoirs, and high service engine and boiler house. "With these parts of the works under construction," he wrote, "the whole can be so nearly completed that water may be furnished to the high service district within two years."[2]

The various annual reports of the Cleveland Water Works document the construction of the Fairmount Reservoir.

In June 1883, a contract for the construction of the low service reservoir—named the Fairmount Reservoir, after its location on Fairmount Street—was let to William McReynolds, John Gawne, John Thomas Gawne, and William James Gawne in the amount of $269,184.50. This sum included "all embankments, excavations, puddle lining, ballasting, concrete, paving, drainage conduit, inlet and outlet chambers, stone stairs, soiling and seeding outer slopes, and all work incidental to that above named … but does not include the inlet and outlet pipes and gates, bridges, fencing and railing." The pipes and gates would be furnished by the Water Works department and "laid by the experienced pipe layers regularly employed at that kind of work." The contract for the bridges, fencing, and railing would be let at a later date.[3]

William McReynolds (1830-1904) was born in County Tyrone, Ireland, and came to Cleveland in 1846 at the age of sixteen. He started in the pork packing business, briefly relocating to Texas in the 1870s. He took up contracting upon his return to Cleveland; in the *Cleveland Directory*

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[2] *Twenty-Seventh Annual Report of the Board of Trustees of Water Works to the City Council, Together With the Reports of the Officers of the Board, for the Year 1882* (Cleveland, 1883), 1, 19-20.
[3] *Twenty-Eighth Annual Report of the Board of Trustees of Water Works to the City Council, Together With the Reports of the Officers of the Board, for the Year 1883* (Cleveland, 1884), 21-22.

for the Year Ending July, 1884 he is listed as a contractor associated with the firm of Harrison & McReynolds.[4] John Gawne (1821-1897) was born at Ballaugh, Isle of Man, where he learned the trade of stonemason. He immigrated to America in 1851, settling in Cleveland in 1852. Besides the Fairmount Reservoir, John Gawne had the contracts for the Cleveland National Bank Building, the Otis Steel Company plant, and part of the National Malleable Castings Company plant. Son William J. Gawne (1853-1931), who, together with John T. Gawne, is listed as a mason in the 1884 Cleveland directory, worked with his father until the latter's retirement in 1889, when he established the Gawne Contracting Company.[5]

At the close of 1883, the earthwork in the outer embankments was reported to be "nearly completed." Work accomplished by Messrs. McReynolds and Gawne was reported to be as follows: earth excavation 169,336 cubic yards; hard shale excavation 17,521 cubic yards; and clay puddle 687 cubic yards. This work was done at a cost of $53,327. The 1883 report continued:

> The two lines of 30 inch outlet pipes for supplying water to the high service pumps, and one of the lines of 36 inch pipe for the low service district have been laid under the west embankment. These pipes are respectively 1-3/4 inches, and 2 inches thick, and are laid on brick piers reaching down to rock. Two rings of brick masonry, laid in hydraulic cement 8 inches thick and 20 inches lengthwise of the pipe, are built over each length of pipe; the trenches are refilled with puddle clay, thoroughly tamped. They are all laid below the bottom line of the clay puddle lining of the basin. The cost of this work was $9,692.68.[6]

In August 1883, a newspaper article commented on the "enormous force of workmen and teams laboring at the junction of [the Nickel Plate Railroad] and [Fairmount] street," noting that "about 170 men and over 50 teams are continually employed, and the work will be pushed steadily forward as fast as the largest possible working force can push it until the frosts of the Winter set in."[7] A year later, the same paper reported labor unrest at the job site: "seventy men employed on the new Fairmount Reservoir on being paid off to-day were informed that their wages would hereafter be cut from $1.50 to $1.25 per day. They all quit work in a body, and some of them grew so riotous that three arrests were made. All is now quiet."[8]

As it detailed the year's progress, the 1884 annual report explained the construction methods employed:

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[4] For a brief biographical sketch, see "Mr. William McReynolds" in *Annals of the Early Settlers' Association of Cuyahoga County, Ohio,* vol. v, no. 1 (1904): 77-78.
[5] "William J. Gawne" in Elroy McKendree Avery, *A History of Cleveland and Its Environs: The Heart of New Connecticut* (Chicago and New York: Lewis Publishing Co., 1918), 3: 339.
[6] Ibid., 22.
[7] "Enormous Reservoirs in Cleveland" (From the *Cleveland Herald*), *New York Times,* August 24, 1883, 3.
[8] "Reducing Laborers' Wages, *New York Times,* August 15, 1884, 5.

> Work on this reservoir has progressed in a satisfactory manner. The earth work in the embankments is nearly completed, the only work remaining to be done is to trim them to line and fill the top where worn away by teams, the soiling and seeding on three of the sides has been done, and the stone steps on the Woodland Hills avenue [Woodhill Road] side are in place.
>
> The waste pipe and drainage conduit are both completed, and the overflow pipe is laid to near the water line ready for the branches that will connect both basins with the waste pipe.
>
> The puddle lining and concrete bottom in the south basin is completed, the puddle lining of the slopes is carried more than half way to the top, and the paving reaches to an average height of about seven feet. For the protection of the concrete, during the winter, the gates in the inlet main were opened and the bottom covered with water to a depth of three and a-half feet.
>
> The excavation in the north basin is nearly to grade and the bottom covered with clay for puddle, which by the action of the winter frost and rains will be in the best possible condition for working in the spring.
>
> Should nothing unusual occur, this work should be fully completed by September next.
>
> The amount paid the contractors for work to December 31, [1884] is $160,521.38.[9]

"September" proved an optimistic prediction. Not until the end of November 1885 was the Fairmount Reservoir "so far completed … that the gates in the inlet pipes were opened on the 29th, and water admitted…" The same day, across town, the gates in the pipes leading to the Kentucky Street Reservoir were closed, and "all the surplus water has been pumped into [Fairmount] reservoir."[10]

Contracts for the iron fencing and embankment railing were let to the Van Dorn Iron Works of Cleveland, and that work was "well under way" at the close of 1885. The iron bridges leading to the valve rods—work let to Thomas Manning, Jr. of Cleveland—were in place, although not yet complete. Shop work for the stair railing, being built by Alexander McCormick of Cleveland, was completed and awaited favorable weather for installation. Two small leaks were discovered in the north basin and awaited repair; "the south basin has been tested to a height of 16 feet, and so far proves to be water tight."[11]

The Fairmount Reservoir was built at a final cost of $391,290.27. "Water has been kept in this reservoir continuously since the first day of December, 1885," reads the 1886 annual report of the Water Works Department, "with the exception of two days in January last when the tunnel

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[9] *Twenty-Ninth Annual Report of the Board of Water Works Trustees of the City of Cleveland, O., for the Year Ending December 31, 1884* (Cleveland, 1885), 31.
[10] *Thirtieth Annual Report of the Water Works Trustees of the City of Cleveland, O., for the Year Ending December 31, 1885* (Cleveland, 1886), 22, 23.
[11] Ibid., 23.

inlet was stopped with ice. The south basin has been filled from a depth of 16 ft. to the over-flow line during all the latter part of the year. The contractors have not yet completed the repairs in the north basin; they have found and repaired the larger leaks, but on account of snow and ice have not restored the pavement… The iron fencing and railing is completed with the exception of a few sections of the handrail on the front stairs."[12]

The small leaks in the north basin were not stopped until sometime during 1888, when water department workmen performed the work and the cost was charged to the contractor. "The reservoir is now in full use," the department reported that year.[13]

Upon completion, the Fairmount Reservoir stored water for the purposes of peak shaving (that is, to offset higher demand during daylight hours), to effect pressure modulation, and to help weather pump outages. It also stored the water destined to be pumped from Fairmount to the high service Kinsman Reservoir.

The reservoir's efficacy was soon proven when, during 1889, the water stored there twice "served to avert a water famine in the eastern part of the city. Once in February, when one of the large mains broke west of the river during a period of cold weather, and again about the last of August or first of September, during the driest and hottest days of the year. During both periods the consumption of water was greater than the quantity that could be delivered…"[14]

That the reservoir grounds were considered a public amenity is evidenced by another note in the same report:

> The beautiful display of flowers along the dividing embankment, maintained from early Spring until killing frost came in November, delighted the many visitors to that attractive spot. The work of propagating and caring for them has been the pride and delight of Mr. Peter Schmitt, the [reservoir] keeper, and I would recommend that a small appropriation be made to enable him to purchase roots and seeds to increase the variety and beauty of the display.[15]

In addition to the floral display, there apparently was a cast-iron fountain in the south basin of the reservoir. Its installation cannot be documented, but its removal can be. In the early spring of 1894, when the south basin was cleaned, "The large fountain in this basin was taken down and abandoned, as the cast iron columns had been split by frost, and the supports were considered

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[12] *Thirty-First Annual Report of the Water Works Trustees of the City of Cleveland, O., for the Year Ending December 31, 1886* (Cleveland, 1887), 25-26.
[13] *Annual Reports of the Departments of Government of the City of Cleveland for the Year Ending December 31st, 1888* (Cleveland, 1889), 698.
[14] *Annual Reports of the Departments of Government of the City of Cleveland for the Year Ending December 31st, 1889* (Cleveland, 1890), 975.
[15] Ibid.

unsafe."[16] It must have been rebuilt, because five years later, in 1899, the department reported that "the columns supporting the fountain in the basin" were judged "so badly broken by frost that it was deemed advisable to remove the whole fountain, which was done, together with …the pipes leading to it."[17]

From 1885 until 1904, the Fairmount Reservoir was supplied with water pumped from the city's original pumping station on Division Street. Beginning in 1904, the reservoir received its water supply from the new Kirtland Pumping Station. In 1917, a new filtration plant at Division Avenue was put into service, and the Fairmount Reservoir received a blend of treated water from Division and untreated water (so-called "raw water") from Kirtland. Department annual reports indicate that the basins were periodically drained and cleaned, the iron fences scraped and painted. In addition, the bridges were regularly re-floored, scraped, and painted. In 1892, "a neat house for the reservoir keeper was built and fitted up on the Baldwin street side, so that he has comfortable quarters for all seasons of the year, and a place for his tools."[18]

In 1903, 3,703 square feet of stone pavement in the north basin was taken up and re-laid, and 382 square feet of pavement pounded down, where the stone lining had reportedly "bulged out in a number of places." The same year, 350 shrubs were set out on the reservoir grounds, 84 poplar trees on the streets surrounding the reservoir were removed, and 86 maple trees were planted in their stead.[19]

In response to a growing population and the need for cleaner water, the 1920s saw a major upgrade of the city's water treatment and storage facilities, including the construction of the Baldwin Reservoir and Filtration Plant, put into service in 1925, and a new Fairmount Pumping Station, put into service in January 1926. Concurrent with these improvements, the Fairmount Reservoir was extensively renovated. Extant engineering drawings, prepared by Cleveland's Van Dorn Iron Works Company and dated February and March 1923, document the changes, which included four new gate houses, new bridges, a new 7' suction tunnel, and new steel pipe inlets. (See site plan on pg. 9, dated September 1926, included with this report.)

With the completion of these new facilities, the Fairmount Reservoir's function changed. Now, untreated lake water in the reservoir (pumped, as before, from the Kirtland Station) flowed by gravity to three low-lift pumps in the Fairmount Pumping Station, which pumped the water up to the Baldwin Filtration Plant for chemical treatment and filtration. From settling basins there, the

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[16] *Annual Reports of the Departments of Government of the City of Cleveland for the Year Ending December 31st, 1894* (Cleveland, 1895), 269.
[17] *Annual Reports of the Departments of Government of the City of Cleveland for the Year Ending December 31st, 1899* (Cleveland, 1900), 294.
[18] *Annual Reports of the Departments of Government of the City of Cleveland for the Year Ending December 31st, 1892* (Cleveland, 1893), 197.
[19] *Annual Reports of the Departments of Government of the City of Cleveland for the Year Ending December 31st, 1903* (Cleveland, 1904), 629.

water flowed by gravity into Baldwin Reservoir. From the Baldwin Reservoir, a large portion of the water flowed by gravity into the network of mains in the Low Service District. The other portion of this water flowed back to the Fairmount Pumping Station, one set of pumps forcing the water into the mains of the First High Service District, the other set of pumps forcing the water into the mains of the new Second High Service District. Thus, Fairmount Reservoir now served as a way-station for raw water destined for treatment at the adjacent Baldwin Plant. This function remained unchanged until the mid-1980s.[20]

In 1985, environmental regulations required the design and construction of new waste solids handling facilities for the Baldwin Filtration Plant. The reservoir's north basin was removed from service and re-graded for this purpose. The new facilities treated water from the drainage of settling basins, the backwash from used filters, and the water processed for the first few minutes through newly cleaned filters until it met quality standards. (Prior to the construction of these facilities, these waters and their solids were deposited without treatment into the nearby Doan Creek.)

With the construction of the new waste solids handling facilities, the reservoir's remaining south basin blended raw water from the Kirtland Pumping Station with the supernatant (the clear fluid above a sediment or precipitate) from the solids handling facilities and sent the mix to Baldwin for treatment. Beginning in 1990, raw water was pumped directly from Kirtland to the Baldwin Filtration Plant for treatment, bypassing the Fairmount Reservoir. Since then, the Fairmount Reservoir's only role has been to accept the supernatant from the waste solids handling facilities and the overflow and under-drain flows from the Baldwin Reservoir. The resulting blended water in the reservoir is then pumped back to the head end of the Baldwin Plant for treatment.

In January 2008, the City of Cleveland Division of Water awarded a contract to Brown and Caldwell Ohio LLC, for design of the Baldwin Residuals and Fairmount Reservoir Project. On July 27, 2009, the Kokosing Construction Company, Inc., headquartered in Fredericktown, Ohio, was authorized to proceed on the construction of this project, which will include improvements to the raw water/recycle tanks and pumps, equalization basin, backwash clarifiers, sludge transfer pumps, sludge storage tanks, and sludge recirculation and discharge pumps. These improvements are intended to increase the flexibility and operation of the waste solids treatment facilities and to optimize the final waste solids disposal system. As part of this project, the remaining basin of the Fairmount Reservoir will be decommissioned and filled in, and the associated Gate House No. 9 will be demolished.

[20] Since all water coming from the Kirtland Station now needed to reach the Fairmount Reservoir for eventual treatment—not just the excess necessary for peak shaving—new transmission facilities were required. Twin 60" raw water mains from Kirtland to the Fairmount Reservoir were installed and came on line with the Baldwin Filtration Plant in 1925.

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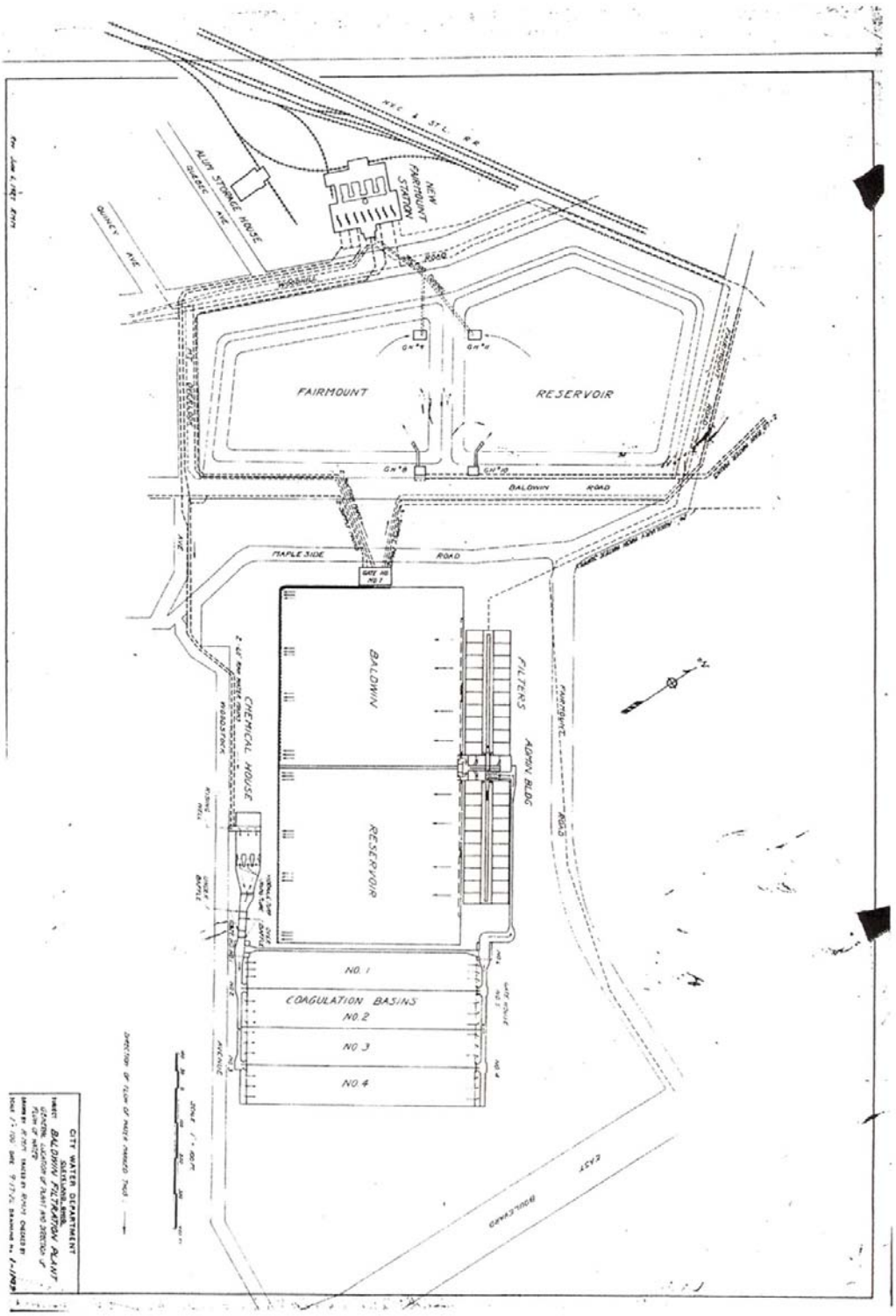

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The author wishes to thank Alex Margevicius, P.E., assistant commissioner, Cleveland Division of Water, for reviewing and commenting on this report.