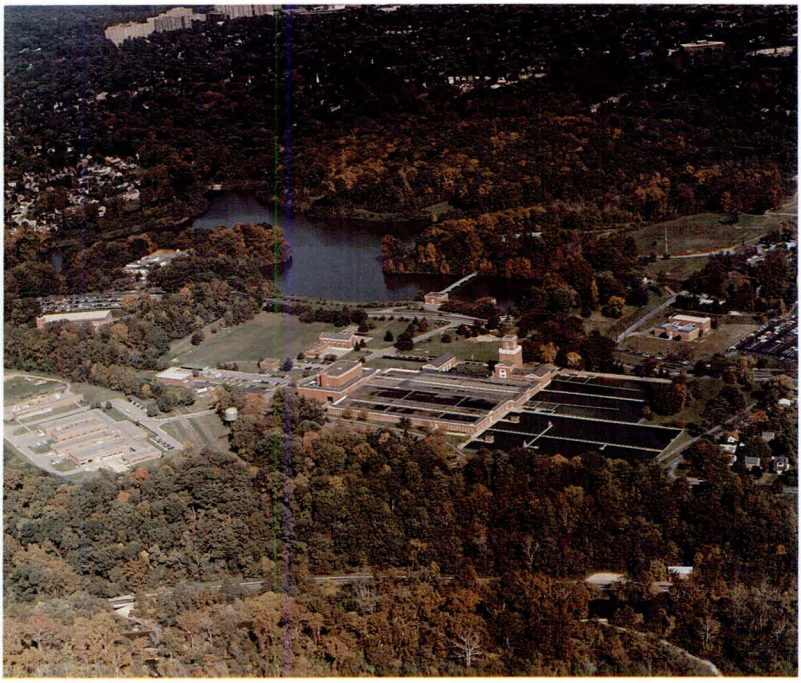
Washington Aqueduct Division



US Army Corps of Engineers
Baltimore District

"The water of the Potomac may, and will be brought from above the Great Falls into the Federal City, which would, in future, afford an ample supply of this object."

—George Washington, 1798

COVER PHOTO
Dalecarlia Reservation, June 1989

The Federal City needed...

WATER

Smith Spring House

Like many other communities of the late 18th Century, the new City of Washington in the Territory of Columbia relied on nearby clear streams, natural springs, and shallow wells for its water. For more than 40 years the town continued without a municipal water supply. One early public works project was the gathering and storing of water in brick lined underground tanks at strategic locations for use in fighting fires.

By 1833 the Federal Government had constructed pipes for carrying water to public buildings from Smith Spring, two miles north of the Capitol. Local citizens promptly formed the habit of tapping the pipes. In 1834 the White House was using the flow from nearby Franklin Square Spring (now known as Franklin Park).

Although there had been no general appeal for better bathing and drinking water, area residents and the Congress were aware of the constant fire hazard. During the War of 1812 British forces burned the Capitol and its collection of historic documents and manuscripts. These were later replaced with books purchased from Thomas Jefferson, but again in December 1851 a fire in the Capitol destroyed much of the Jefferson library.

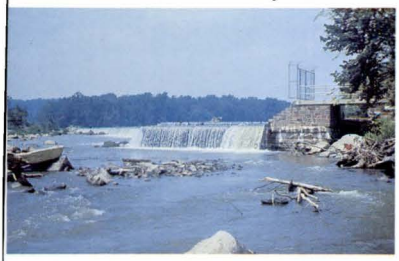
It was this incident as much as anything which appears to have inspired Congress to appropriate $5,000 in 1852 for an examination of "the most available mode of supplying water" to the city.

Covered wagons cross Cabin John Bridge (about 1862).

ts Source...

As early as 1798 George Washington xpressed the belief that the Potomac iver could furnish an ample supply of vater for the District of Columbia. In 1852 he Potomac was recommended as a ource by Lieutenant Montgomery C. Meigs of the Corps of Engineers, who was o become the first engineer of the Washington Aqueduct. Congress approved he Meigs plan in 1853 and provided funds or construction of a waterworks.

Many of the original structures, completed in 1863, are still functioning to bring raw water from Great Falls on the Potomac, about 10 miles northwest of the District of Columbia boundary.



Great Falls Diversion Dam.

Great Falls to Dalecarlia

A masonry dam diverts Potomac River water through a screened intake structure at Great Falls, Maryland, into two raw water conduits. The original brick masonry conduit carries water nine miles by gravity through a number of tunnels, and across bridges. The Cabin John Bridge, about six miles downstream from Great Falls, supports the conduit over the Cabin John Valley. For 40 years after its construction this imposing granite structure could boast of being the longest (220 feet) masonry arch span in the world. Potomac river water from Great Falls first entered the aqueduct system on December 5, 1863.

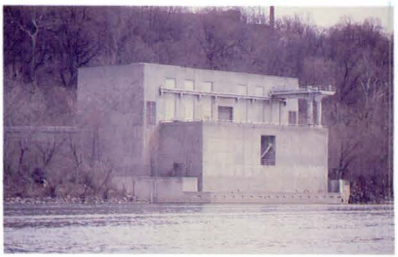
Access to the conduit was provided in 1870 when a road was built for maintenance crews who needed to inspect the aqueduct faculties and make necessary repairs. The route originally known as

Dalecarlia Water Plant.

Conduit Road was later named MacArthur Boulevard in honor of General Douglas MacArthur.

In 1926 the second raw water conduit was constructed parallel to the original one. At Cabin John Valley an inverted siphon was used instead of a bridge crossing as for the old conduit. The combined capacity of both conduits is 200 million gallons per day. Three interconnections between the two conduits allow maintenance crews to make repairs to either pipe without putting the entire system out of service.

Cabin John Bridge and Siphon.



Little Falls Pumping Station.

The Potomac River

Dalecarlia Plant

The receiving reservoir at Dalecarlia was originally designed to permit the mud to settle from the raw water. It proved very effective in removing the heavier particles but did not eliminate the fine suspended material which was destined to give the city water supply a muddy, yellowish color until filtration was finally adopted.

A rapid-sand filter plant was completed in 1928. Other major filtering and chemical treatment facilities have been added since that time to bring the total plant capacity to 220 million gallons per day. Purified water is pumped from the Dalecarlia Water Treatment Plant to four service-level areas within the District of Columbia and to Arlington and Falls Church, Virginia.

Little Falls Pumping Station

To meet the increased demands of the growing District of Columbia metropolitan area, a second diversion dam, intake works and a pumping station were constructed in 1959 at Little Falls on the Potomac River. These facilities provided an additional independent supply of raw water (525 million gallon per day capacity) which is pumped directly from the river into the Dalecarlia Reservoir. During construction of the dam, a 36-inch pipeline was built across the river to supply purified water from Dalecarlia to consumers in Falls Church, Virginia.

Gatehouse at Georgetown Reservoir.

McMillan Reservoir.

Georgetown Reservoir

Beginning in the 1860's the Georgetown Reservoir was used to store unfiltered water for several days, allowing it to settle before being released into the city's distribution mains. Today this structure is used as a sedimentation basin. From here partially-treated water passes through the four-mile long Washington City Water Tunnel to McMillan Reservoir.

At Georgetown Reservoir there is a distinctive gatehouse which resembles the castle emblem of the U.S. Army Corps of Engineers.

McMillan Plant

Washington, D.C. watermains received their first supply of clear Potomac River water in 1905 after the slow-sand filter plant at McMillan Reservoir was placed in operation. The original plant was replaced in 1985 by a modern 120 million gallon per day rapid-sand filtration facility. Water can be pumped from the McMillan plant to any area within the City of Washington.

Near the center of McMillan reservoir is a tower marking the location of Smith Spring which supplied some Government buildings with water as early as 1831.

Water Treatment Processes

Chlorine Arrives at Chlorine Storage Building.

When the Potomac River reaches the intakes at Great Falls, it has drained an area of 11,460 square miles and the water has already served a number of communities upstream. To make it ready for further use by consumers the Washington Aqueduct employs three basic processes for purifying the water that enters the receiving reservoirs.

The first process is coagulation and sedimentation. Chemical feed machines continually measure out the proper amounts of aluminum sulfate (alum) to be mixed into the water. Alum is a coagulant that forms a small, fluffy mass called "floc" in natural water. Floc particles are about the size of snowflakes, and collect the suspended matter from the water. After the alum is thoroughly mixed into the incoming water and the floc is formed, the water passes slowly through sedimentation basins where the floc and its collection of heavier suspended matter settles to the bottom. Powdered activated carbon is added, as needed to remove tastes and odors.

Next chlorine is added to the water. Liquid chlorine is fed from one ton containers into a chemical building where machines called "chlorinators" are used to measure and introduce this chemical into the water to kill disease-carrying organisms.

Alum Feeders.

Finally the water enters a filtration area and flows through anthracite coal or mixed media filters that trap remaining floc and bacteria.

Hydrated lime is added to neutralize acid conditions created by the addition of alum. Additional chlorine is added to ensure that the water is safe throughout the distribution system. The water is treated with fluoride to promote better dental health.

From here the water is collected in mains and carried to underground clear water-storage basins. It is then ready for distribution to homes, businesses and industries.

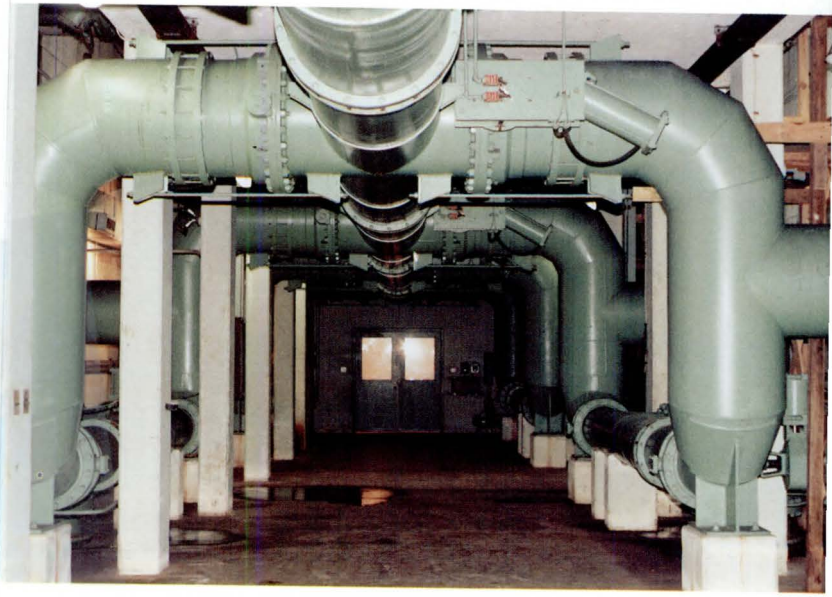
Remote operating panels and stations are linked with electric, electronic and pneumatic controls to provide an efficient treatment process. Metering and recording

Disinfectant Metered by Chlorinators.

devices give the operators a continuous flow of information about plant operations and the condition of the water. The chemicals and treated water are systematically tested and analyzed in modern chemical and bacteriological laboratories to make certain that the water meets the standards of quality established by the Environmental Protection Agency.

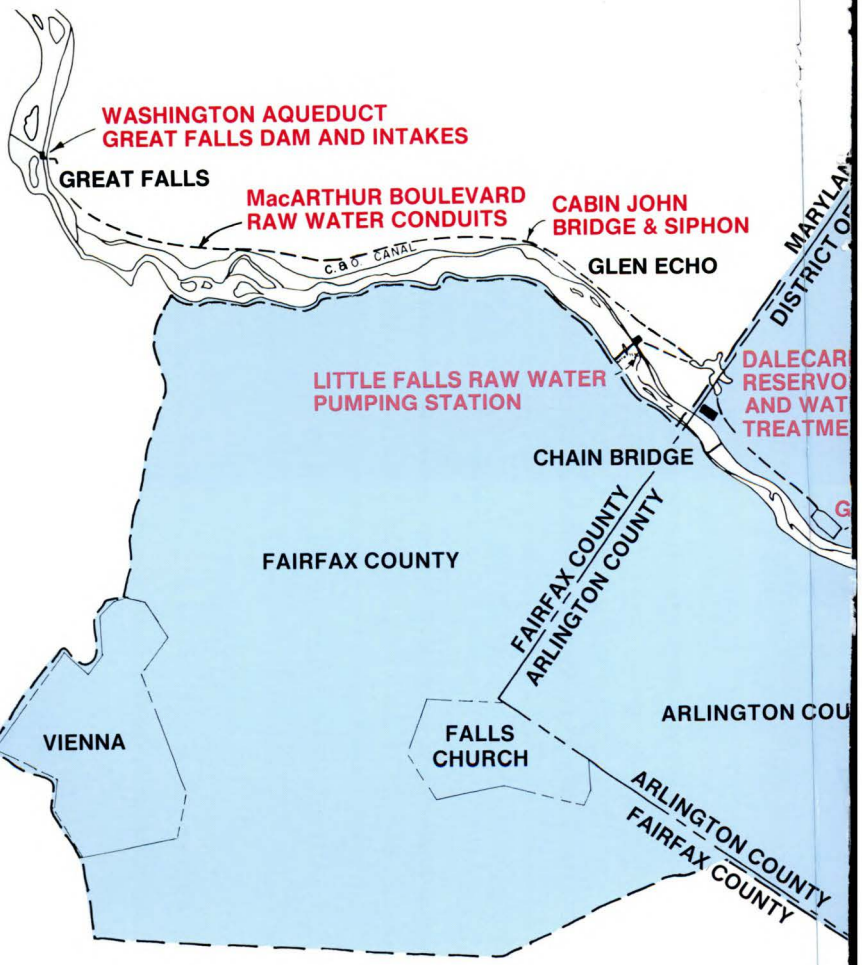
Chemicals and Raw Water Being Mixed.

Master Control Panel.



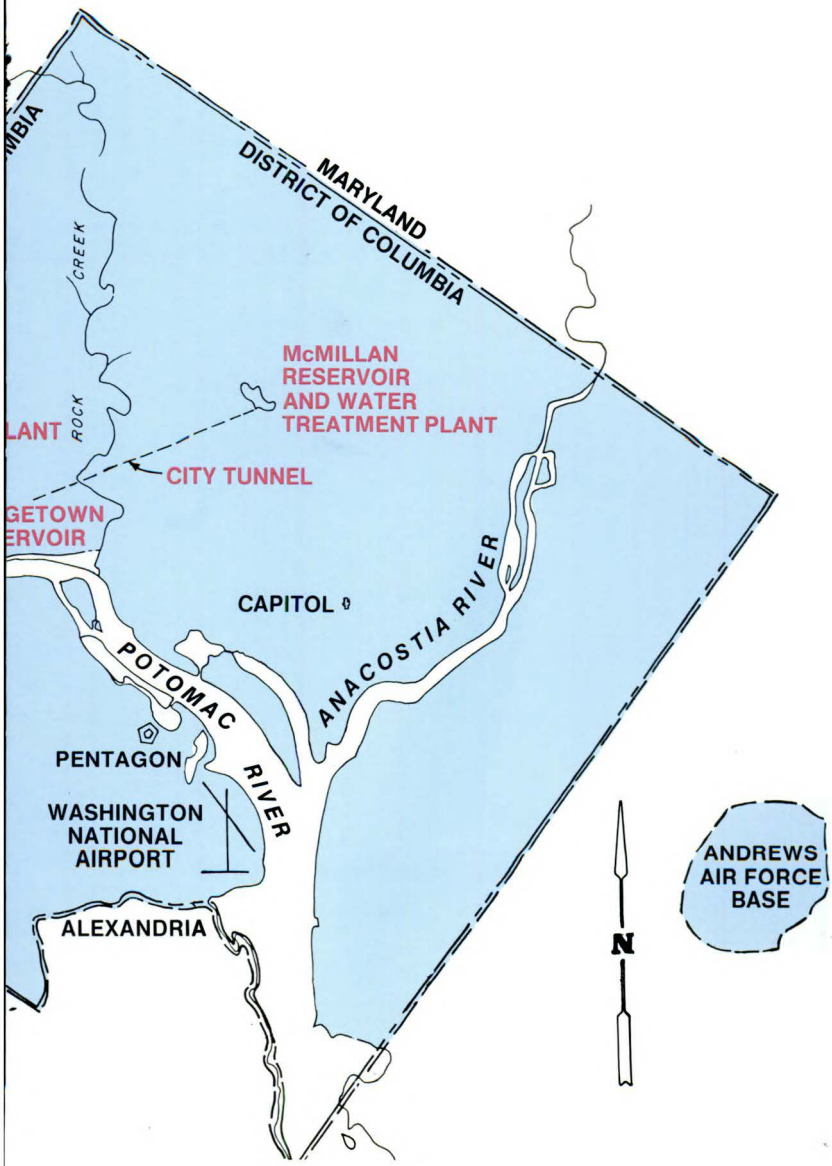
Pipe Gallery.

The Washington Aqueduct — Servi



NOTE: Light blue color indicates service area.

Area and Major Facilities



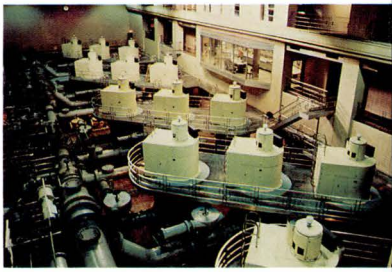
Human Factors

Residents and hundreds of thousands of visitors to Washington D.C., Arlington County, Virginia and 50 square miles of Northern Virginia served by the City of Falls Church, Virginia may never have reason to wonder if supplying a drink of water is more than a simple task of pumping river water through city mains to fountains and faucets. However, the efficient production of good drinking water is the every day concern of the people at the Washington Aqueduct.

Operators Clean Intake Bar Screens.

Lab Technicians Analyze Water Samples.

Routine Pump Maintenance.



Dalecarlia Pumping Station.

Water treatment plant operators run the machines and pumps and watch over the control panels. Electricians, pipe fitters, carpenters, machinists, industrial control mechanics, and painters care for the plant and its equipment around the clock. Engineers, chemists, microbiologists and other specialists provide the technical knowledge that insures high standards of quality during all phases of the water treatment process.

Management of the Washington Aqueduct requires an experienced administrative and clerical staff to oversee the budgeting and procurement functions for the production of water used daily in the Washington Metropolitan Area.

Employees in the scientific and professional fields apply their formal education and previous work experience to the task of meeting the needs of the water supply system by planning and designing modifications to existing facilities or to constructing new ones to insure that the public is served well into the future.

Technicians Repair Electronic Equipment.

Engineers in Field Inspection.

Part of the Administrative Staff.

Excavation to Locate Pipeline

Repair Pipeline

Spring Flowers

Final Product

Organization Mission

The Washington Aqueduct Division of the U.S. Army Engineer District, Baltimore, provides the water supply for approximately 1 million residents of the District of Columbia and Northern Virginia, and to the Federal Government. Construction of the Washington Aqueduct was begun in 1852 by the Corps of Engineers. When the system went into operation in 1859 the aqueduct was placed under the control and superintendence of the Chief of Engineers.

The mission of the Washington Aqueduct is the collection, purification, and pumping of an adequate supply of potable water for the District of Columbia, Arlington County, and the City of Falls Church, Virginia. Water distribution in these areas is the responsibility of the local governments.

The water produced by the Washington Aqueduct meets all standards promulgated by the EPA under the Safe Drinking Water Act. Funds for the operation and maintenance are derived solely from the sale of water.

Group tours of the aqueduct facilities may be arranged for organizations and educational institutions (Jr. High School level and above).

by contacting the office of:

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Revised — April 1991

FLOW DIAGRAM

WASHINGTON AQUEDUCT DIVISION
U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT