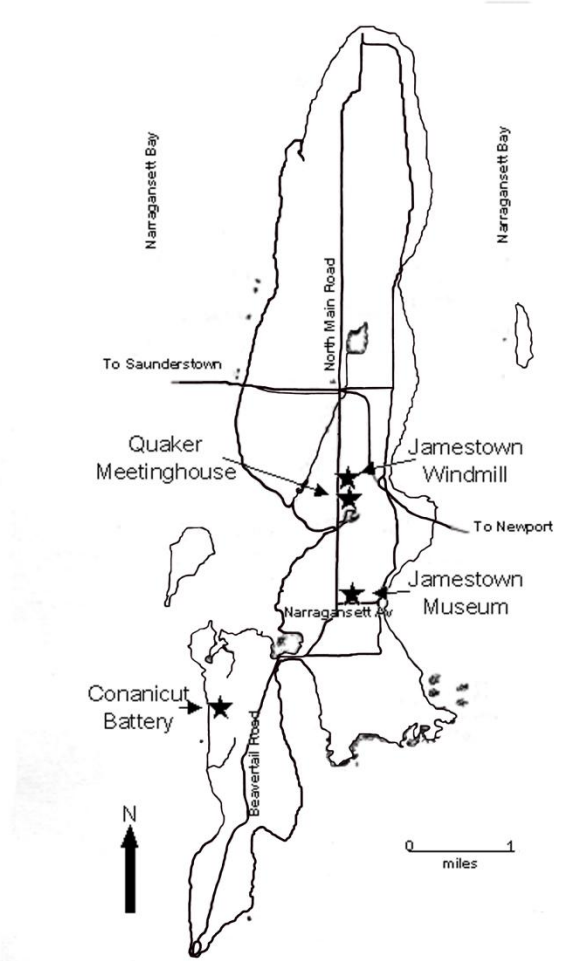
The Jamestown Windmill

North Main Road
Jamestown, Rhode Island

Owned and maintained by
Jamestown Historical Society
Jamestown, Rhode Island

Open to the Public
Summer weekends and by appointment

Map of Jamestown Historical Society Sites



History of the Jamestown Mill

The Jamestown mill, owned and maintained by the Jamestown Historical Society, stands at the top of Windmill Hill in the center of Conanicut Island at the entrance to Narragansett Bay.

This mill is not the first on Windmill Hill. Early in the 18th century, a mill stood where the current mill now stands. When Colonel Joseph Wanton, Jr., a colonial Deputy Governor, bought the land in 1760, the mill was not in use and he fenced in the mill lot as part of his farm.

During the American Revolution, Wanton was loyal to the British king. When the British occupation of Jamestown and Newport ended in 1779, he fled Rhode Island. The state confiscated his property.

Early in 1787, the freemen of Jamestown asked the Rhode Island General Assembly to give the town one-half acre of the confiscated farm as the site for a new mill. In March, the General Assembly voted to give the land to the town on the

Jamestown Windmill in operation about 1890

condition that "they erect and keep in repair a good windmill for grinding grain." The windmill was built at once and still stands on its original site.

The mill is a three-story building with eight sides. The original framework of the mill is of hand-hewn chestnut timbers. It is shingled on the outside with cedar shakes. A domed cap, or **bonnet**, rests freely on the gently sloping sides of the building. The **bonnet** is kept in place only by its weight. The **bonnet** holds the **sails**, the **wind shaft** to which the **sails** are attached, and the gears that transform the power of the wind into usable energy.

Several terms can be used to describe the Jamestown mill. It is a **windmill** because it uses the wind for energy. It is a **gristmill** because the wind's energy is used to grind grain, and grist is grain that has been prepared for grinding. It is also called a **smock mill** because the shape reminded some people of the linen smocks worn by early millers.

For 109 years, until 1896, the mill ground coarse cracked corn to feed animals and finer corn meal for people to eat. In Jamestown, corn meal was usually made from the dried kernels of white flint corn. White flint is a species of Indian corn that is native to Rhode Island. Each kernel has a hard outer layer and low water content. The corn is hard to grind, but makes a fine, floury meal.

White flint corn is seldom grown now. It cannot be grown near other varieties of corn, because it reproduces by open-air pollination and mutates on contact with other strains. In addition, the yield is generally very low.

In 1896, the Jamestown miller found that he could no longer compete with the rolling mills in the west, which produced cheaper meal and flour by crushing the corn kernels between large steel rollers. He had to close the mill.

The windmill was neglected for eight years. One of the sails was broken in a storm. Vandals stole some of the

machinery. Then, in 1904, a group of Jamestowners interested in saving the mill formed the Jamestown Windmill Association. They raised money to buy the mill and to repair the worst damage.

In 1912, the mill was given to the newly-formed Jamestown Historical Society. The society adopted a drawing of the mill as its logo and took over the upkeep of the mill.

Maintaining the mill has been expensive and time-consuming. Powder post beetles try to bore into the old wood. Small animals of all kinds seek refuge in the building during the winter. **Sails** have several times been destroyed in hurricanes and nor'easters. Major restorations have been required every 15 to 20 years. The most recent complete restoration of the exterior in 2000-2001cost over $70,000.

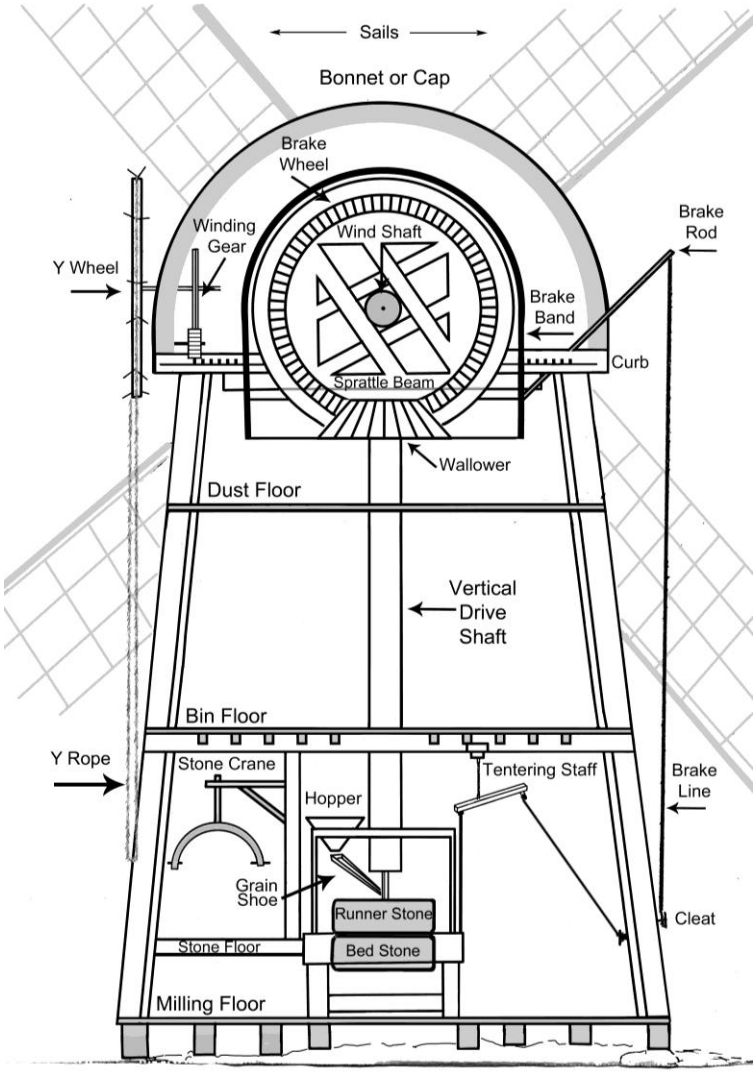
Money to take care of the windmill comes from many sources. The society raises funds through events and membership dues. Visitors are asked for donations. In 1987, two historical society members – sisters Nan Thompson and Margaret Evans – set up a fund for mill upkeep. In 2006, a Windmill Endowment fund was started at the Rhode Island Foundation. Income from these endowments pays for a large part of the everyday expenses.

Grants from charitable foundations have been critical to any major work at the mill. The 2000-2001 renovation was funded in part by grants from the Rhode Island Foundation and the Champlin Foundations, as well as other local non-profits. Most recently, a grant from the Rhode Island Council for the Humanities was used to improve signage and safety in the mill.

While the mill has been restored to working condition, the last 100 years have brought major changes in the surrounding area. Trees have grown tall, and Windmill Hill is no longer open to breezes from all directions. Now, the strong and steady breeze needed to run the mill's sails only rarely reaches the sails through the surrounding foliage.

How the Windmill Works

The windmill has three floors. Each floor is devoted to a separate part of the milling operation. The grindstones are on the ground, or **milling**, floor. The second, or **bin**, floor is used for storage. The third, or **dust**, floor houses the equipment that transform the wind into usable energy.



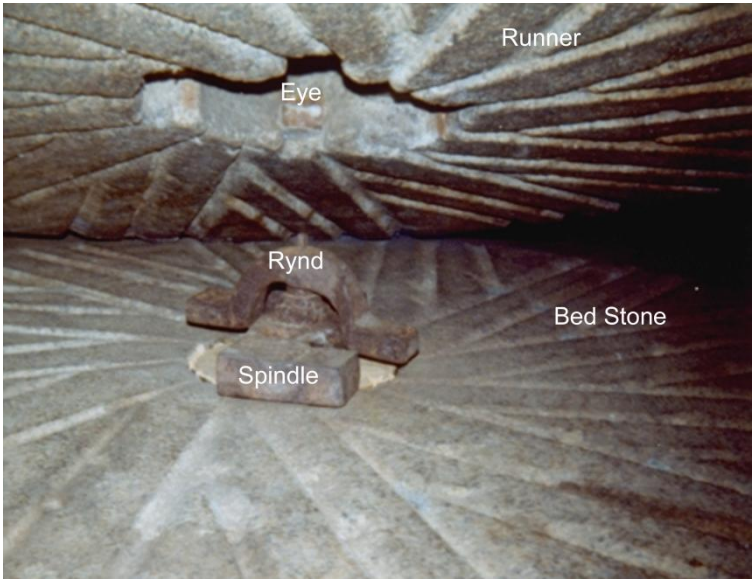
The Milling Floor

The milling floor has two levels: the **meal floor** and, elevated three feet above it along the west wall, the **stone floor**. Corn is ground on this level.

There are two **grindstones**. Each stone weighs about 3,500 pounds (1,590 kilograms). The stone on the bottom, the **bed stone**, does not turn or move. It is fixed in a heavy frame called a **husk**. The upper stone, or **runner**, turns, crushing and slicing the grain.

The **runner** can also be pushed up and away from the **bed stone**. An iron shaft, called a **spindle**, passes through the center of the **bed stone**. On top of the **spindle** is an iron cross, the **rynd**, that fits into troughs, called **gains**, around a hole, the **eye**, in the center of the **runner**.

Under the **bed stone**, the **spindle** sits on a bearing on a large beam called a **bridgetree**. When the miller raises the **bridgetree** using a block and tackle, the **runner** is pushed up. Moving the **runner** away from the **bed stone**, called **tentering**, frees the stone so that it can rotate. The distance



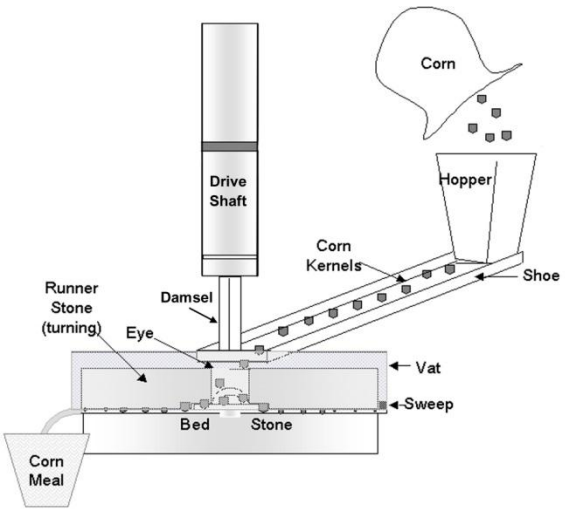
between the stones also controls the quality of the meal that is ground – coarse for animal feed and fine for human use.

A square iron **damsel** at the end of the **drive shaft** goes through the **eye** of the **runner.** The **damsel** is attached to the **spindle** and **rynd** and, when it turns, the **runner** turns.

When the **runner** is turning, corn kernels in a **hopper** flow down a **shoe** to the eye of the runner. The **shoe** rests against the turning **damsel**, which jiggles the corn into the **eye**. The angle of **shoe** and the amount of corn in the hopper help control the flow.

The corn kernels are cut into smaller and smaller pieces by the sharp edges of the **furrows** in the grindstones and are abraded by the roughened **lands** between the **furrows**. The smaller and smaller pieces are guided by the **furrows** to the outer edge of the stone.

When the meal emerges around the stones, it is confined in a narrow channel by an encircling wooden **vat**. It is then swept to the **meal spout** above the collecting sack by small paddles, or **sweeps**, fixed on the side of the **runner**. The meal bag is suspended on a special rack that allows the bag to be replaced quickly.



The Bin Floor

In most **smock mills**, the **grindstones** are on the second floor, and the ground meal is fed down to the first floor for bagging and storage. That was the design of the Jamestown mill when it was built in 1787.

After **grindstones** have been sharpened, or **dressed,** many times, they wear thin and have to be replaced. Sometime in the late 19th century, new **grindstones** were installed in the Jamestown mill. The mill was redesigned with the stones on the first floor. The second floor was given over to storage. Two trap door, one in the floor over the south entrance to the mill and one over the center of the **stone floor,** allowed the miller to raise and lower sacks of corn and ground meal.

No one knows why the design was changed. Some people think that the new stones, which weigh about 3,500 pounds each, were too heavy to be supported by the existing structure, which at that point was close to 100 years old.

The Dust Floor

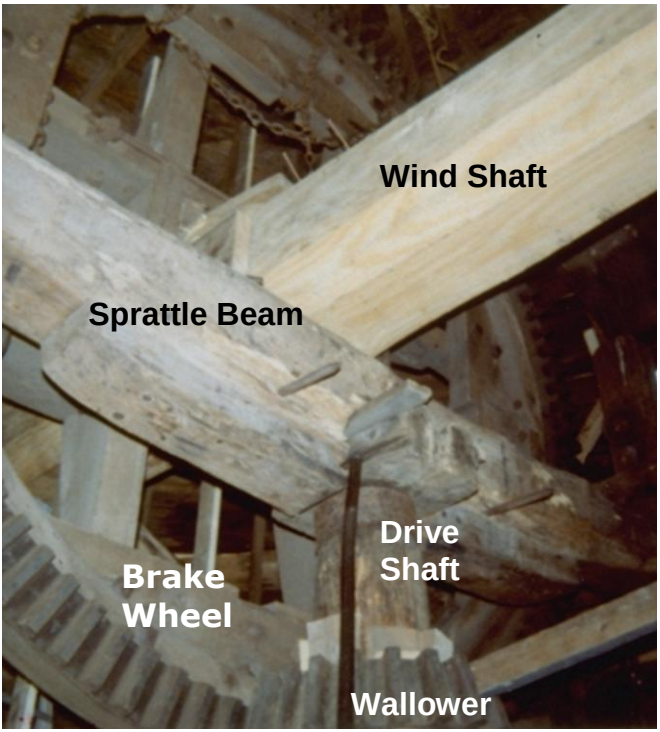
The third, or **dust,** floor is covered by the **bonnet.** In the **bonnet** are gears that rotate the **bonnet** to catch the wind and other gears that transfer the horizontal rotation of the **sails** to the vertical **drive shaft** that powers the **runner**.

The **bonnet** rests freely on a greased wooden bed, or **curb.** A slightly elevated **ring gear** with 220 teeth keeps the **bonnet** from turning freely. When the **bonnet** needs to rotated so that the **sails** are in the desired relationship to the wind, the **Y-wheel** on the outside of the mill is turned using the **Y-rope** that runs between the sprockets on **Y-wheel** and reaches from the **bonnet** to the ground.

The **Y-wheel** turns the **winding gear** inside the **bonnet.** The **winding gear** teeth mesh with the teeth in the **ring gear** and rotate the **bonnet**.

The energy of the wind is captured by the **sails** on the outside of the **bonnet.** The **sails** are mounted on the **wind shaft.** Two **stocks** pass through the **wind shaft** at right angles to each other. The shaft of the **sail**, called the **whip,** is clamped to the **stock**. When the mill is in use, **cloths** are raised on the **sails** to catch the wind.

The **wind shaft** passes through the wall of the **bonnet** and turns with the **sails.** A massive wheel, called the **brake wheel**, encircles the **wind shaft** and fills up the middle of the **dust floor.** The **brake wheel** is rimmed with teeth. The teeth on the **brake wheel** engage similar teeth on the much smaller **wallower,** a gear that is mounted near the top of the vertical **drive shaft**, which is held erect by the **sprattle beam**. The **drive shaft,** and with it the **runner,** makes five revolutions for each turn of the **sails** and the **wind shaft**.



The **brake wheel** got its name because it is used as a parking brake that holds the **wind shaft** and the **sails** still when the mill is not in use. A **brake band** – originally made of green wood and now made of wood with a metal strap outside it – loops over the top of the **brake wheel**. A heavy **brake rod** anchors the **brake band** against the **brake wheel**. The **brake rod** is lifted by a lever that is controlled by a **brake line** hanging outside the building. This enabled the miller to free the brake from the ground or to immobilize the mill when not in use.

The **brake band** was not used to control the speed of the **sails** or to stop the mill. Friction and heat caused by stopping the **brake wheel** by tightening the **brake band** could cause a fire. In an emergency, the miller could drop the **runner** onto the **bed stone.** The action, however, would ruin the grinding surface of both stones.

Dressing the Stone

When they are used regularly, **grindstones** need to be **dressed** periodically to keep the cutting surfaces sharp. The Jamestown miller would have **dressed** his stones after 200 to 300 milling hours.

First, the grinding surfaces have to be uncovered. To reach the grinding surfaces, the miller disconnects the **drive shaft** and removes the **hopper**, **shoe**, and **vat**. He swings the **stone crane** over the stones and fits the large iron pins on each end of the U-shaped **bail** into the holes on each side of the **runner**.

He lifts the **runner** with a hand-turned **screw jack** and moves it clear of the **bed stone**. He then flips the **runner** so that the grinding surface is facing up and lowers the **runner** to the **stone floor**, so that he can work on it.

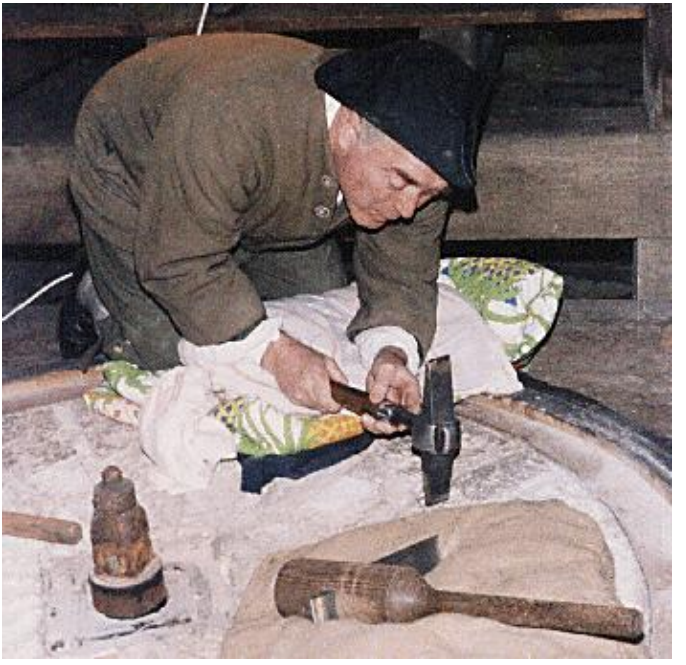
The surface of a grindstone is divided by deep grooves called **furrows** into separate flat areas called **lands.** The stone dresser's first task is to make sure that the **lands** of

the stone are flat. He passes a **paint staff** covered with chalk or other colored dusk across the stone. If any of the chalk gets on the stone, he smoothes out the irregularities.

Then, he begins to peck away at the **furrows** using a **furrowing pick,** a hammer-like tool with sharp edges where the hammer head would be. The longest furrows are about 1¼ inches (3.175 cm) wide. One edge of each furrow is cut as sharp and as clean as possible. The opposing faces of the stones are furrowed so that the sharp edges act like scissors, cutting the grain in smaller and smaller pieces.

To roughen the **lands** between the **furrows,** the dresser drops 10 or 12 **cracking picks,** which are heavy, sharp pointed rods, on the stone, using the weight of the **picks** alone to create the pattern in the stone.

Dismantling, **dressing,** and reassembling a pair of stones ready for grinding was a full day's work for the miller and his helper.



The Miller's Day

It is easy to imagine that when there was wind and grain to be ground, the miller would have been a very busy man.

First he would raise the **runner** and release the **brake band** so that he could pull the **sails** of the mill around and set the canvas **cloths**. Then he would turn the **bonnet** to let the **sails** catch the wind. The **sails** would begin to turn, gradually moving faster as the inertia of the heavy **runner** was overcome. If **runner** rotated faster than he wanted, he would turn the **bonnet** off the wind a bit, as too much speed would burn the grain. The miller would adjust the clearance between the **runner** and **bed stone** for the quality of meal he was milling and feed grain into the **hopper**.

During the run he would stay alert, checking the flow of grain down the **shoe**, stepping out to turn the **bonnet** if necessary with any change in the force or direction of the wind in order to maintain an even speed, and perhaps adjusting the height of the **runner** as he monitored the emerging meal. He would also attend to the final bagging.

Occasionally, the wind would rise suddenly, making the **sails** turn too fast. If turning the **bonnet** off the wind would take too long to slow the **runner**, immediate action would be needed. The miller would flood the stones with grain and then lower the **runner** onto the **bed stone** – hence the expression "to come to a grinding halt."

At the end of the day or when there was no more corn to be ground, the miller would turn the **sails** off the wind to bring them to a stop. He would either remove or furl the **cloths**, tighten the **brake band** around the **brake wheel,** and lower the **runner** to rest on the **bed stone**.

The Miller's Fee

In 1787, the Miller's fee for grinding one bushel (35.24 liters) of corn was three quarts (3.3 liters). It took him 30 to 90 minutes to grind one bushel.

The Millers

Jethro Briggs. 1788-1795
Nathan Munro. 1795-1827
Caleb F. Weaver. 1827-1847
William G. Carr. 1847
Arnold Hazard. 1847-1850
Job W. Hazard & Eben Tefft. 1850-1855
John W. Potter. 1855-1874
Isaac W. Potter. 1874-1882
Elijah Anthony. 1882-1883
William A. Barber. 1883-1888
Philip A. Brown. 1888-1893
Thomas A. H. Tefft & Jesse C. Tefft. 1893-1896

Jonnycakes

The origin of the name jonnycakes is not clear. Some feel that the name used to be journeycakes because the cooked cakes travel well and many can be carried in small sack.

Cornmeal was a staple in the diet of local farming communities. Jonnycakes were eaten daily by a large number of people. It has been said that there are as many recipes for jonnycakes as there are cooks in Rhode Island. Arguments still arise over the relative merits of the Newport County type, made with milk, and the South County type, made by scalding the cornmeal with boiling water.

Many cooks use a combination of the two, as in this recipe:

Rhode Island Jonnycake

1 cup Rhode Island cornmeal
1 tsp. salt
1 tsp. sugar
1¼ cups of boiling water
¼ to ½ cup of milk
Mix dry ingrediants. Add water and mix well. Thin with milk. Drop by tablespoonsful onto a well-greased griddle or heavy frying pan over medium heat (380 degrees for electric fry pans). Cook for 6 minutes, turn and cook for about 5 minutes. Serve with butter and syrup.

Technical Data

Millstone:
- diameter: 5 and a half feet / 1.68 meters
- thickness: 15 inches / 38 centimeters
- estimated weight: 3500 pounds / 1,590 kilograms

Spread of arms: 50 feet / 15.24 meters
Sail area: 540 square feet / 50 square meters
Gear ratio: 1 revolution of arms = 5 turns of stone
Diameter of base: 20 feet / 6 meters
Diameter of base of bonnet: 15 feet / 4.6 meters
Teeth in ring gear at base of bonnet: 220
Turns of Y-wheel necessary for quarter turn of bonnet: 16

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The cost of maintaining the Jamestown Windmill is partially offset by interest from the Jamestown Historical Society Windmill Endowment Fund, established at the Rhode Island Foundation in 2006. Donations to the Fund are enthusiastically welcomed and are used exclusively for the upkeep, maintenance, and repair of this historic structure. Donations may be sent to

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or

Jamestown Historical Society Windmill Endowment
Rhode Island Foundation
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Jamestown Historical Society Sites

Jamestown Windmill
North Main Road

Jamestown Museum
92 Narragansett Avenue

Quaker Meetinghouse
North Main Road & Weeden Lane

Conanicut Battery
Battery Lane

Jamestown Historical Society Vault
93 Narragansett Avenue

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