Warren County has become a leader in the protection of the remnants of the Morris Canal by promoting a greenway corridor and preserving the historic remains of the canal as an important part of the County’s transportation history. The vision is to have this greenway extend across Warren County with the canal as a link to recreational, cultural, and historic areas including state park trails, and municipal and county public open space. This greenway will extend between Phillipsburg and the historic Waterloo Village—a restored canal town.

In some places the towpath will become a recreational trail open to the public for non-motorized activities. In other places pocket parks will be established for the public’s enjoyment. When completed, this greenway will be a living reminder of the County’s transportation history while promoting the economic benefits of cultural and heritage tourism.

Warren County offers a wide range of recreational opportunities and its rural nature and scenic beauty are worthy of long-term preservation.

**The Morris Canal**

Listed on the State and National Register of Historic Places

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**For Further Information Contact:**

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Belvidere, NJ 07823
908-475-6532

**WARREN COUNTY MORRIS CANAL COMMITTEE**

c/o Warren County Planning Department

**WARREN COUNTY BOARD OF RECREATION COMMISSIONERS**

c/o Warren County Office of Land Preservation
908-453-2650

**PUBLIC INFORMATION AND TOURISM DEPARTMENT**

908-475-6580
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**WEB SITES:**

www.co.warren.nj.us
www.morriscanal.org
www.canalsocietynj.org

**Prepared by:**

**WARREN COUNTY MORRIS CANAL COMMITTEE**

Funding provided by Warren County Board of Chosen Freeholders

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Design: MacGraphics

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**Morris Canal Inclined Plane 9 West**

**WARREN COUNTY, NEW JERSEY**

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**A Link to Our History**

**A Pathway to Our Future**

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**POWER HOUSE**

Morris Canal Inclined Plane 9 West was a large and powerful machine that could raise or lower a fully loaded canal boat 100 feet in less than fifteen minutes. To provide the power, water was brought to the plane house once housed in the power house from the upper level of the canal in an overhead trough called the headrace flume. From the end of the flume, the water was dropped into a wooden and iron penstock pipe to operate a reaction turbine below. The column of water in the penstock weighing many tons forced the rotor to turn like a huge lawn sprinkler. A shaft transmitted power from the turbine rotor to gearing that turned a cable drum in the power house above. The cable was engaged on the cable drum in the power house and the bottom of the canal flume, dropping hundreds of tons of water at the rate of 200 tons every second. The cable drum engaged the cable and turned the machinery at the power house. The brakeman rode the cradle car to the power house. The brakeman manned the controls and operated the machinery at the power house once housed in the plane house. The inclined plane, organized the loading of the canal boats. With a helper, the brakeman rode the cradle car up and down the plane. In some places the towpath would become a recreational trail open to the public for non-motorized activities. In other places pocket parks would be established for the public’s enjoyment. When completed, this greenway will be a living reminder of the County’s transportation history while promoting the economic benefits of cultural and heritage tourism.

Warren County offers a wide range of recreational opportunities and its rural nature and scenic beauty are worthy of long-term preservation.
The Inclined Plane

To help the canal climb over the New Jersey Highlands on its way from Phillipsburg to Jersey City, the Morris Canal & Banking Company developed inclined planes to raise and lower its canal boats up to 100 feet at a time. Built in the 1830s and redesigned in the 1850s, these huge machines were up to 1,400 feet long and capable of moving boats loaded with 70 tons of cargo from one canal level to the next. The canal used 23 of these inclined planes and 350 lift locks to overcome an elevation change of almost 1,700 feet, an unbroken world record. After years of service, the canal was abandoned in 1923 and much of its infrastructure was dismantled. However, at Inclined Plane 9 West the plane tender’s house, turbine chamber and tailrace tunnel are still in place making this site one of the best remaining examples of these engineering marvels.

1. The Power House

The stone foundations of the power house is still intact with its opening covered with iron bars. You can see the reaction turbine that once powered the plane still in place in the chamber below. Nearby are assembled pieces of the penstock and parts of the machinery. Across the driveway is the plane itself marked by a double row of sleeper stones. A modern reconstruction shows how the plane rails were supported on heavy wooden timbers that provided a flexible cushion between the rail and the sleeper stones.

2. The Tailrace

Downhill from the power house is the iron arch that frames the end of the tailrace tunnel. Here, used water from the turbine chamber and water from the bypass flume joined to flow down the tailrace channel and into the lower level of the canal at the bottom of the plane. When tours are being offered, it is possible to walk up the tailrace tunnel and into the turbine chamber. The huge reaction turbine that once powered the plane almost completely fills the room. When the plane tender opened the tub valve above, the pressure of thousands of tons of water would send the head of the turbine spinning at about 60 revolutions per minute. Water from the turbine’s four nozzles would fill the chamber and send a river surging down the tailrace tunnel.

3. The Plane Summit

At the top of the plane the summit acted as a dam to contain the water in the upper level of the canal and divert it into the headrace flume. A double set of tracks came up the plane, over the summit and back down into the water. The 90-foot-long canal boats and cradle cars were built in two hinged sections that could flex as they crossed the summit of the plane. Plane 9 West’s double set of tracks and two cradle cars, allowed boats to go up and down the plane at the same time.

The Water

The water to power the inclined plane was brought to the powerhouse from the upper level of the canal in a headrace flume supported on a wooden trestle and stone piers. At the power house the water was dropped 47 feet to turn a reaction turbine located in a chamber below. Used water exited the turbine chamber through a tailrace tunnel and flows into the lower canal level to be used to power the next inclined plane. When the inclined plane was not in operation, water was routed through a bypass flume and channeled directly to the lower level of the canal.

The Cable

The two-inch-diameter wrought iron cable formed a loop traveling on idler pulleys from the cable winding drum in the power house to sheave wheels located under water in the upper and lower levels of the canal. As the cable drum turned it pulled the cable and moved the cradle cars loaded with canal boats up and down the plane.

The Cradle Cars

Canal boats were transported up and down the inclined plane on wheeled cradle cars riding on iron rails. To facilitate loading and unloading the boats the rails extended down into the bottom of the canal at both ends of the plane. The cradle cars rolled down into the water and the boats were floated on. A brakeman supervised the loading, rode the cradle car up and down the plane, and applied a brake to keep the car under control. Both the boats and cradles were built in two sections so that they could flex as they crossed the summit of the plane.

A cradle car and canal boat on its way up the inclined plane.