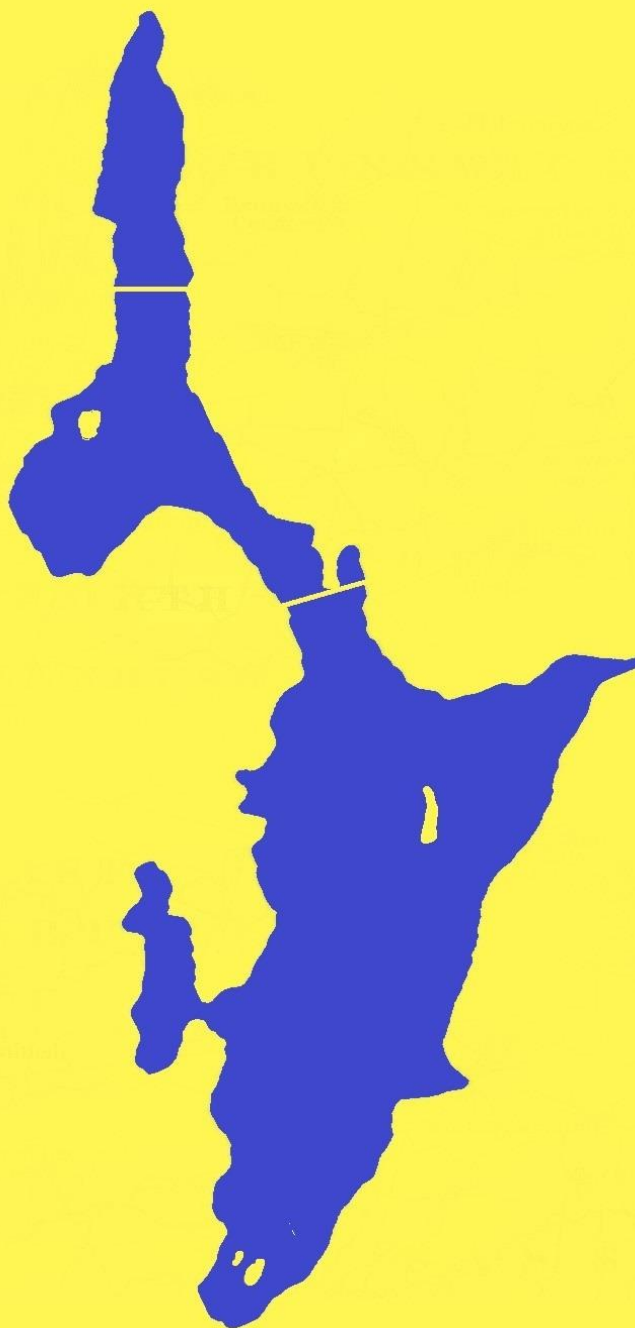


The valve that helped start the Industrial Revolution in America, and helped to win the Civil War

By Wayne L. Pratt

In conjunction with The Burden Lake Preservation Corporation



Disclaimer:

This booklet is our best representation of the History of the Outlet Valve at the base of the Dam on Burden Lake, based upon many hours of research and interviews with individuals. The cause of the Guard Shack tumbling into the lake and resulting demise of the valve operation is partly speculation but the most probable scenario of what actually happened.

Larry McKeough

Many of the original documents shown in this booklet plus many more reside in a locked fireproof file cabinet in the BLCA Club House.

The information in this booklet was assembled in April 2024 by Wayne Pratt and Larry McKeough of the Burden Lake Preservation Corporation.

History of the Valve, and Valve Guard Shack on Burden Lake

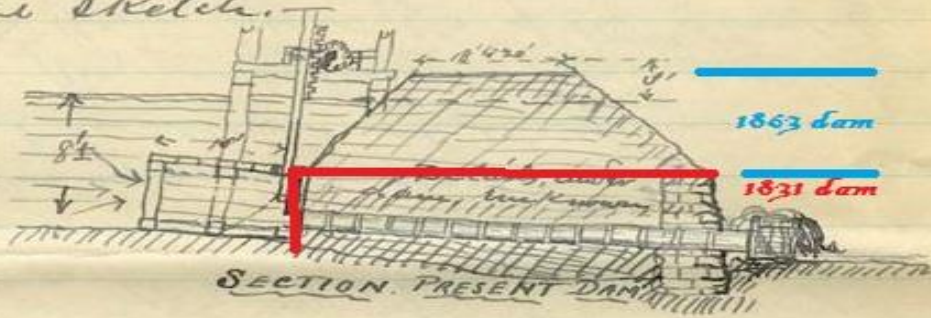
In 1831, the Wynantskill Improvement Association (WIA), an association of water-powered mill owners along the Wynantskill Creek, received permission from the NYS Legislature to make a new water reservoir adding to the ones they already had, Crooked, Glass, and Crystal Lakes. They had to install a complete Dam System consisting of a Diversion Dam (Weir) installed in the Wynantskill Creek (which sets the water level of the reservoir), a 900' Canal and Berm, and a hand stacked stone and earthen Dam across the outlet stream from Martin's Lake. The Dam had a wooden pipe through the bottom with a control gate / Valve to control the flow of water from the new reservoir (now called Burden Lake) back to the Wynantskill Creek. With this Valve they could augment the amount of water flowing in the Creek when needed, allowing them to provide sufficient, consistent waterpower to all 16 mills that were downstream from the Weir. This system of storing water and releasing it at will, marked a major step in the beginning of the Industrial Revolution in America. Storing water was like storing electricity today. In those days, the water (not electricity) powered all the manufacturing mills.

One of the largest mills on the Wynantskill was the Burden Iron Works of Troy. The water wheel that powered their mill generated 1200 horsepower, one of the largest in the world. They manufactured nearly all of the horseshoes used by the Union Army during the Civil War. Each of Burden's nine horseshoe machines produced sixty horseshoes per minute, or about fifty-one million horseshoes per year. Keeping the horses shod was a big deal at the time, something the South was struggling with. The Union Army had 3.4 million horses to keep in shoes!

The Dam System on Burden Lake, finally installed in 1863, was unchanged until after the infamous 1889 Johnstown PA. flood which killed some 2000 people. The WIA immediately hired Engineer David M. Green (Director of R.P.I. at the time) to assess the entire system of lakes and dams to ensure they couldn't have a catastrophic event like Johnstown. In July 1889, Mr. Green prepared a comprehensive 19-page report for the WIA. There were deficiencies in the system which needed to be fixed ASAP. Most recommendations were implemented beginning that same year. At Burden Lake, among other things, Green recommends raising & improving the dam and replacing the deteriorating wooden pipes and gate valve with modern cast iron pipes and gate valve which got installed shortly thereafter. The new style 30" cast iron outlet pipe and valve, possibly manufactured by Ross Valve (still in business in Troy), was installed at the base of the Dam under the Burden Lake Road. The valve was on the east (Lake side) in a small building (known as the Guard Shack), and the outlet was on the west side of the Dam. This Cast Iron outlet pipe replaced the original deteriorating wooden pipe and gate valve from 1863 and is still in place today. The Guard Shack is gone, the valve is laying on the bottom of the lake, and the outlet side of the pipe is capped off for now.

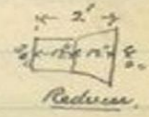
than will be necessary for ordinary use; but I deem it wise to provide pipes of this size for use upon extraordinary occasions.

The section of this dam, through the trunk and gate is about as shown in the sketch.

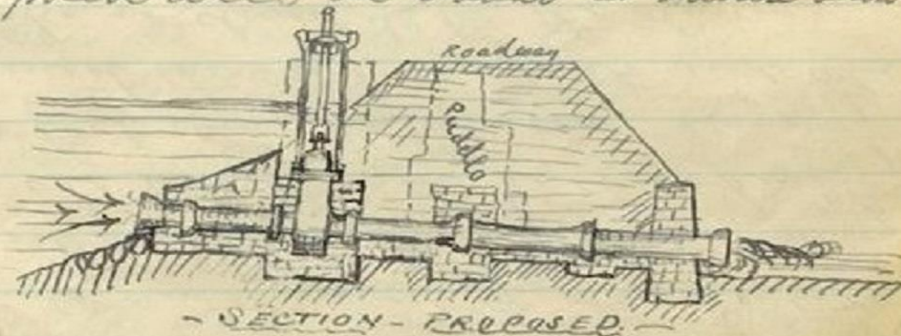


Green's 1889 drawing which shows a cross section of the Dam at that time. Drawing shows the original slide type Valve and wooden pipe.

Probably of lengths - 12 ft each - of 30 inch pipe, a 30 in gate, and a 40" to 30" reducer, will be required here. The reducer need be only 2 feet long, instead of 5 feet, as suggested to Messrs. Bell & Arts.



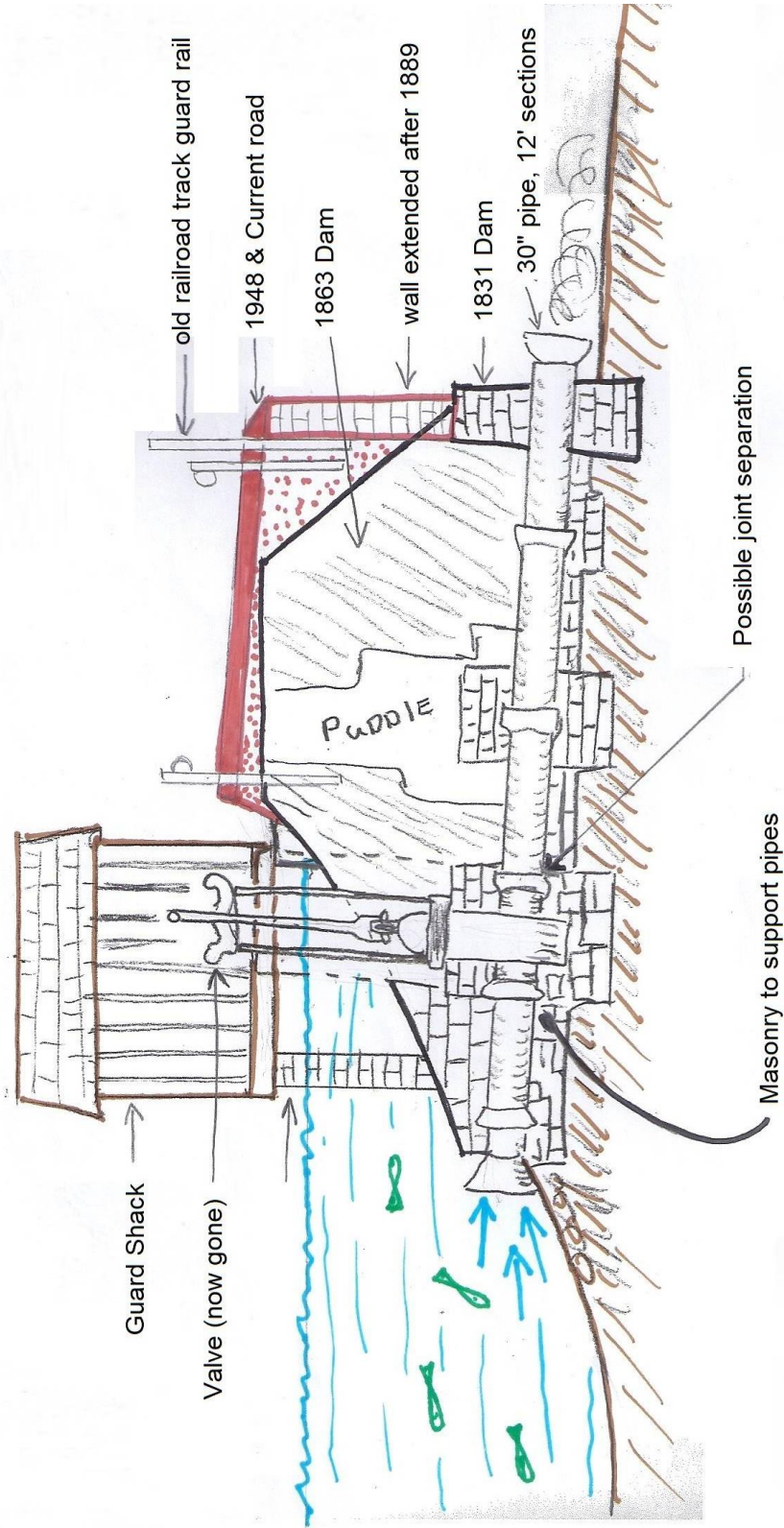
The section of the dam, with the pipe, of iron, as proposed will be about as shown below.



Green's 1889 drawing of the recommended replacement with "New Style" Cast iron pipe & Gate Valve, installed shortly thereafter.

Drawing shows what we believe to be the cross-sectional view around 1975 looking south. Shows 1863 Dam with 1948 road improvement. Also shows the Gate Valve, cast iron pipe, and Guard Shack all installed around 1889/1890. Today the Guard Shack is gone, valve is laying on the bottom of the lake, and outlet pipe is capped off.

#2 Side view, original pipe under current road



Beginning in 1863, when the mills downstream needed more water to turn their water wheels, the Gate Keeper would open the Valve releasing 3,168,000 Gallons per day. The water exited the pipe and flowed back to the Wynantskill, joining it near Garner Road. We have records of the process still in place in 1950. Edward Ernst was the Gate Keeper in 1950. He would report the level of the water in the WIA reservoirs (Glass Lake, Sand Lake (now called Crystal Lake), and Burden Lake) every day and forward a report from the "Office of the Gate Keeper of the Wynantskill Improvement Association, Sand Lake" and send them to the Burden Iron Co. in Troy. We believe they may have been communicating from Troy directly to the Guard Shack via Telegraph in the early years, and by telephone in later years allowing them to notify when, and how much water to release.

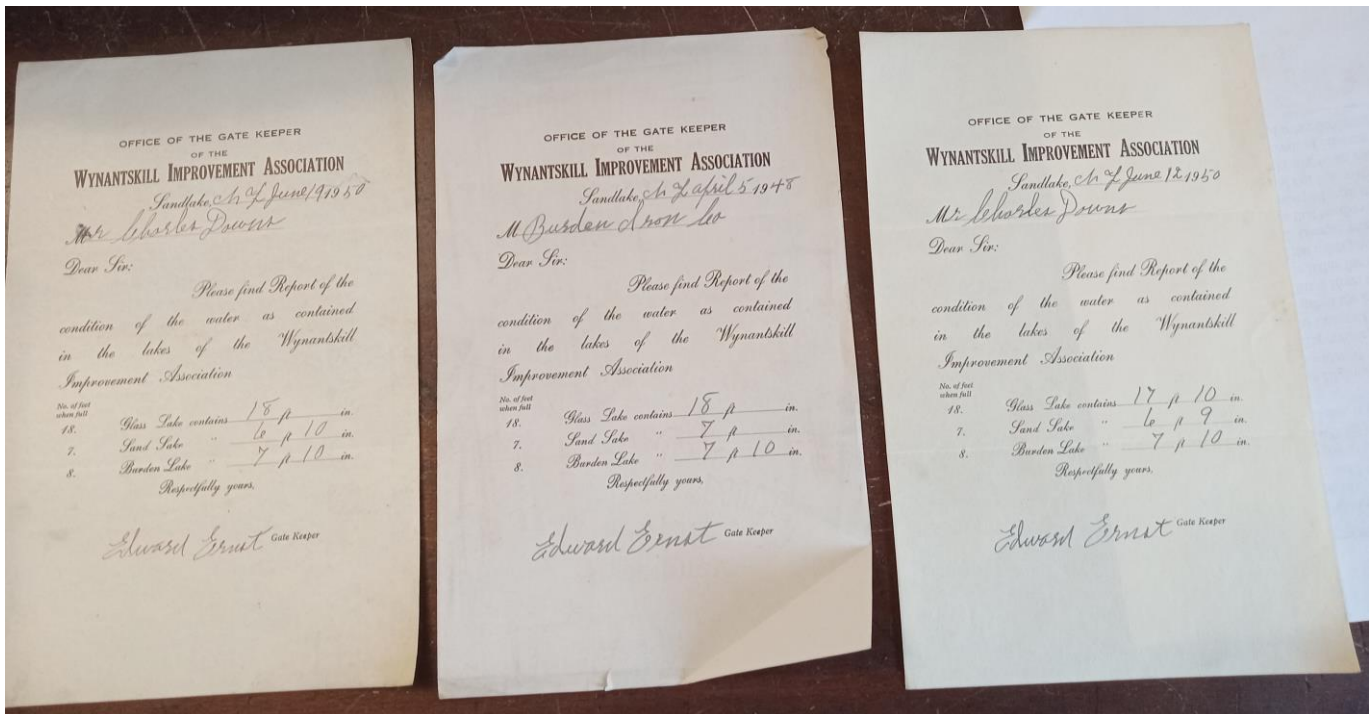


Photo of the original valve stem still at the Glass Lake Dam Manufactured by the Ludlow Valve Co. from Troy N.Y. The one in the Burden Lake Guard Shack was probably similar to this one. It would have had a large wheel on top, when turned, would open, or close the valve.

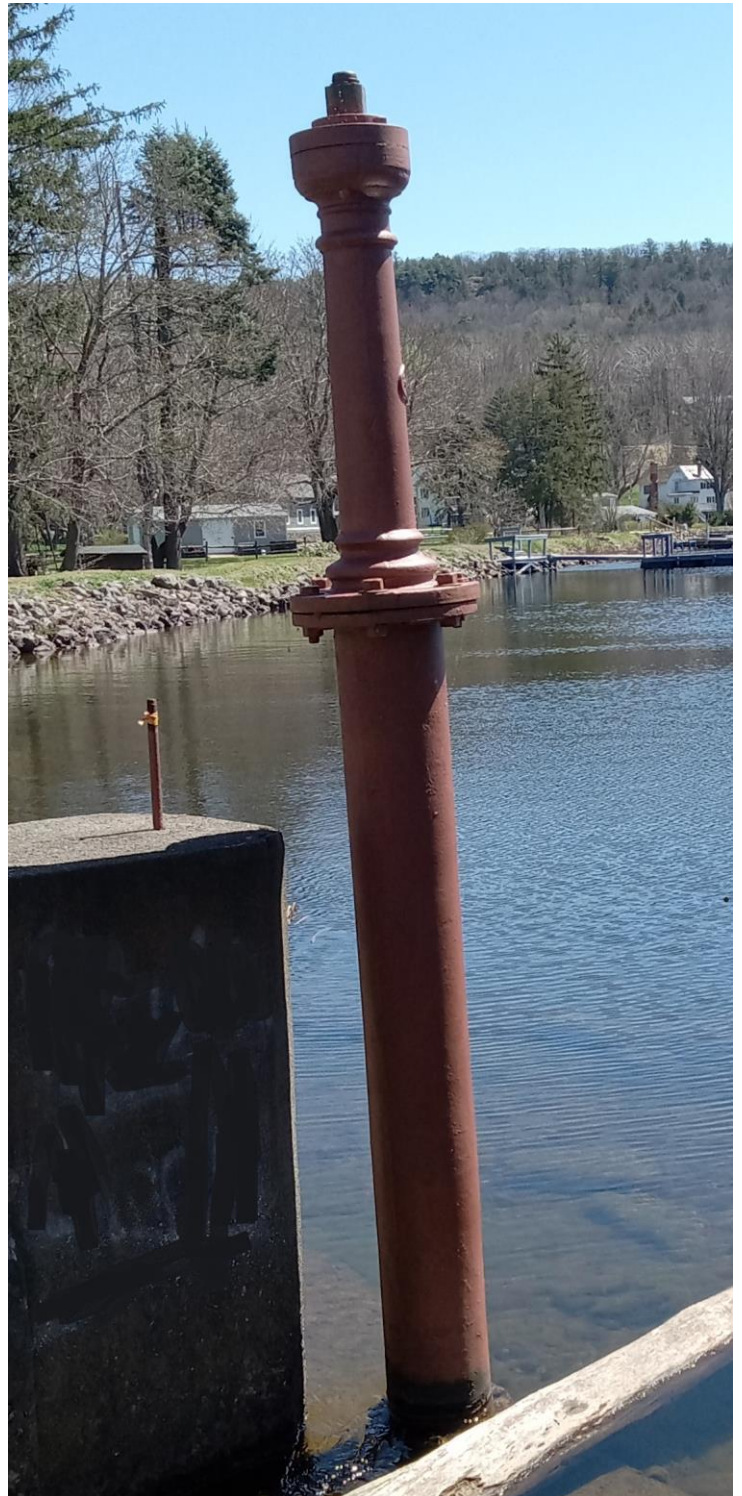


Photo courtesy of Larry McKeough

This valve was utilized for many years, originally as described above, and in later years to release excess water from the lake in the fall (in anticipation of large amounts of snow and the resulting spring snow melt), or during large rain events.

Portec was the last standing member of the original Wynantskill Improvement Association who had control of the water in Burden Lake, Crystal Lake, Crooked, & Glass Lake. By the 1940's, the only thing they used the water from the Wynantskill for was the cooling purposes in the mill. I'm told from the late 1960's until about 1976, they allowed Bonded Concrete to use the water to wash stone and make concrete being used to help build the Empire State Plaza. As far as we know, Portec basically stopped regulating the water from Burden Lake around 1976. Portec went out of business in 1998. When Portec stopped regulating the water there were some problems with a few lower- level camp/house sites flooding around the lakes. Eventually one of those owners, Mr. X., had the key to the Guard Shack and permission to open the valve to release water when needed. This was from around 1972 until the Guard Shack toppled into the lake in the lake in the 1980's.



Photo shows Robelotto's camp (on 3rd. Lake near Kays) flooding in the mid 70's

Photo courtesy of Vinny Robelotto

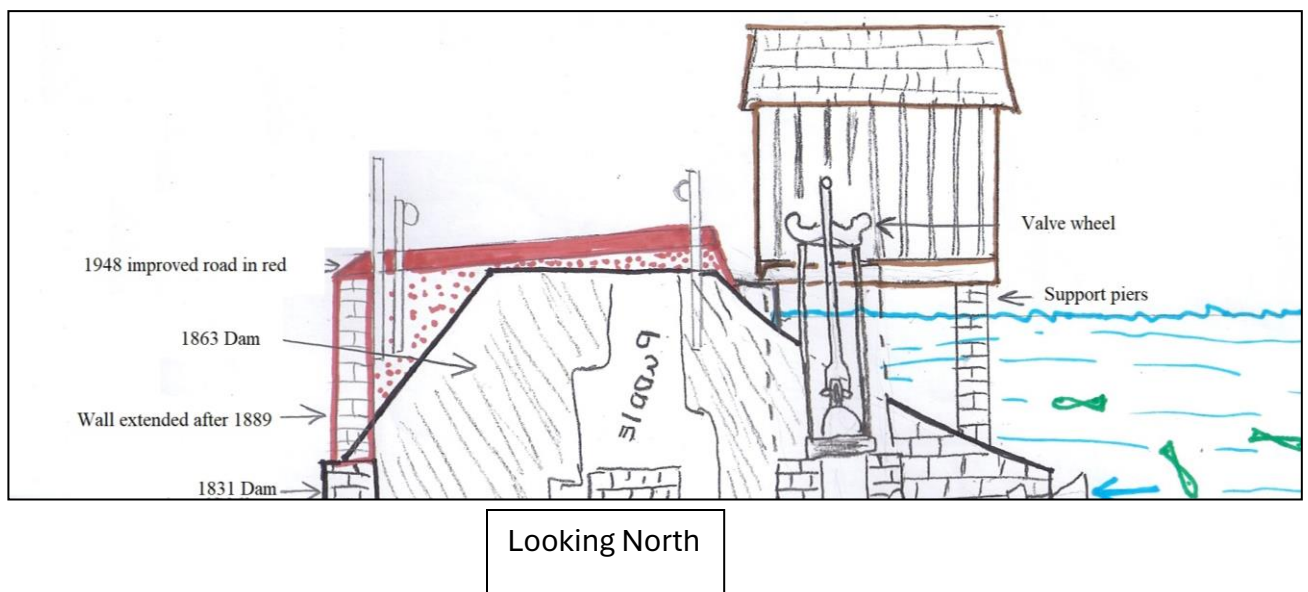
Then in the 1980's, late in the winter, the Guard Shack toppled into the frozen lake. At the time no one knew why it fell in. In a short time, they did realize that water was discharging out the west side of the pipe. Mr. X. went to investigate and attempted to close the valve. We're pretty sure the valve stem had shifted inside the fallen shack. We think Mr. X. could open the valve allowing more water to flow but when closing the valve as tight as he could, it wouldn't stop all the water flow. The assumption was that there must be a stick or something jammed in the valve. Come spring, the concern was the leaking water would begin to have an impact on the water level in the lakes.

When Mr. X. attempted to close the valve, why didn't the valve stop the leaking??

We believe when the shack was pushed off its pier, it put so much pressure on the west side of the valve's pipe joint, that it separated a little and was allowing lake water to bypass the valve and leak through the loose pipe joint pouring out the west side of the exit pipe. We don't think the Valve was faulty or blocked and believe the valve was already closed all the way when Mr. X. tried to close it, and it may still be operable today.

What follows is our best estimate of what actually happened to the old Guard Shack and Valve.

The Guard Shack was originally installed around 1890 over the wheel which operated the valve. In those days the road on top of the dam was only 18' wide and the Guard Shack was only about 5 feet off the road. In 1948 the County widened the top of the dam to 30' so the road would meet the current standards. In doing so, the top of the dam and the road were extended on both the East & West sides. When complete, the Guard Shack was only a few feet off the road. (They could not widen the road to the west too far because the dam's stone wall prevented it.)



We believe the Guard Shack was supported by a couple of piers on the lake side and rested on a large wood beam on the shore/roadside. The Shack tumbled into the lake in the 1980's when the shack was about 100 years old. Who knows what condition the shack was in, or how well it had been maintained, or even if it had been replaced at some point.



Looking North
Photo courtesy of Sean Baldwin



Photo courtesy of Sean Baldwin

We think the demise of the shack and Valve was caused by snowplows.

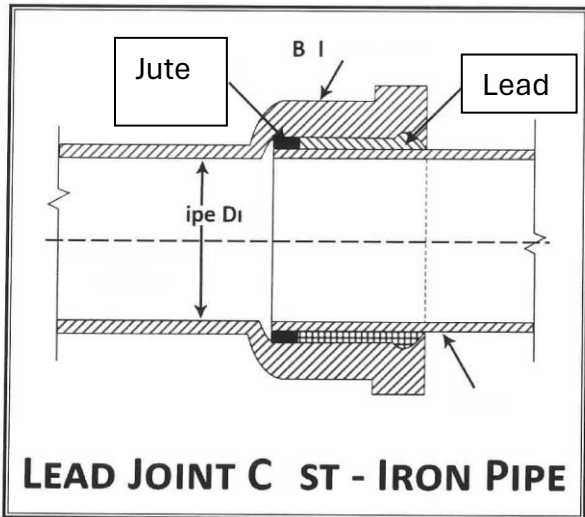
Since 1948, when the County widened the Dam, the shack was very close to the edge of the road. For about 40 years snowplows heading north towards Averill Park, traveling at 30 MPH most likely pushed snow against the Shack. Especially during large snow falls. Wet, heavy snow would have been the major contributor from the throwing force of the snow at the front of the shed.



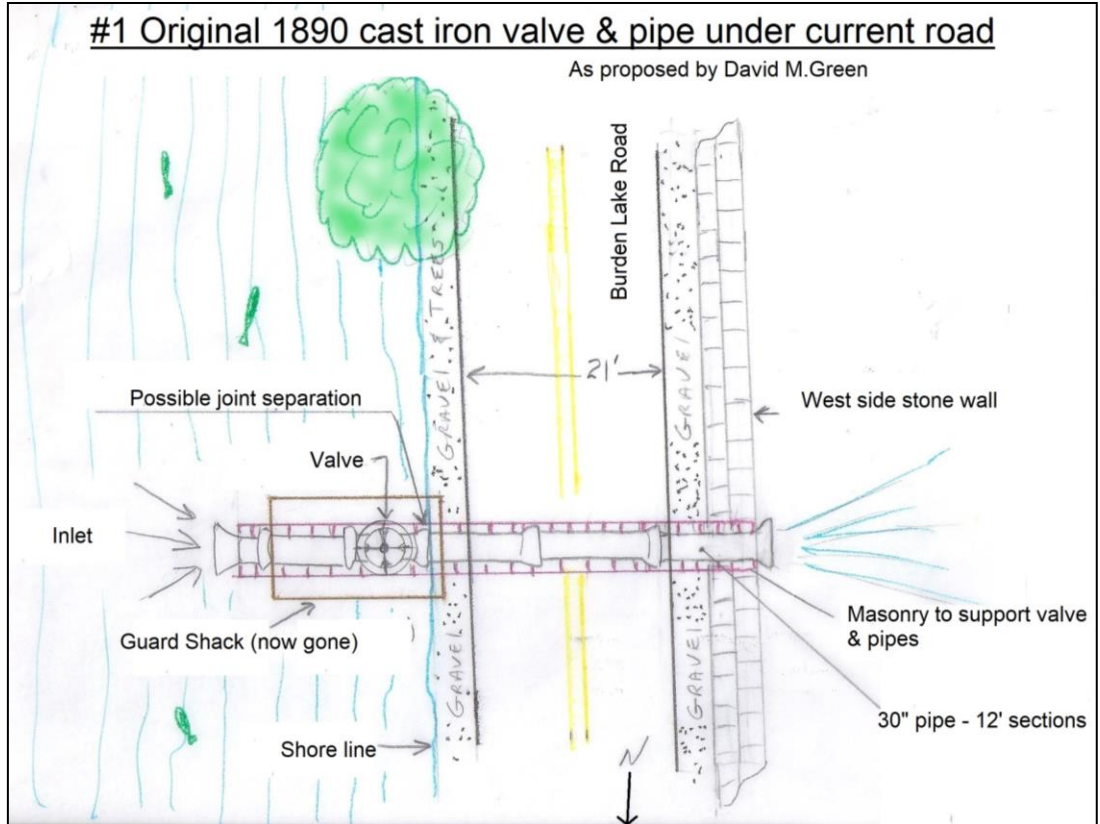
Stock photo

**Let's look at the mechanics of how the Valve, pipes,
& Guard Shack were connected.**

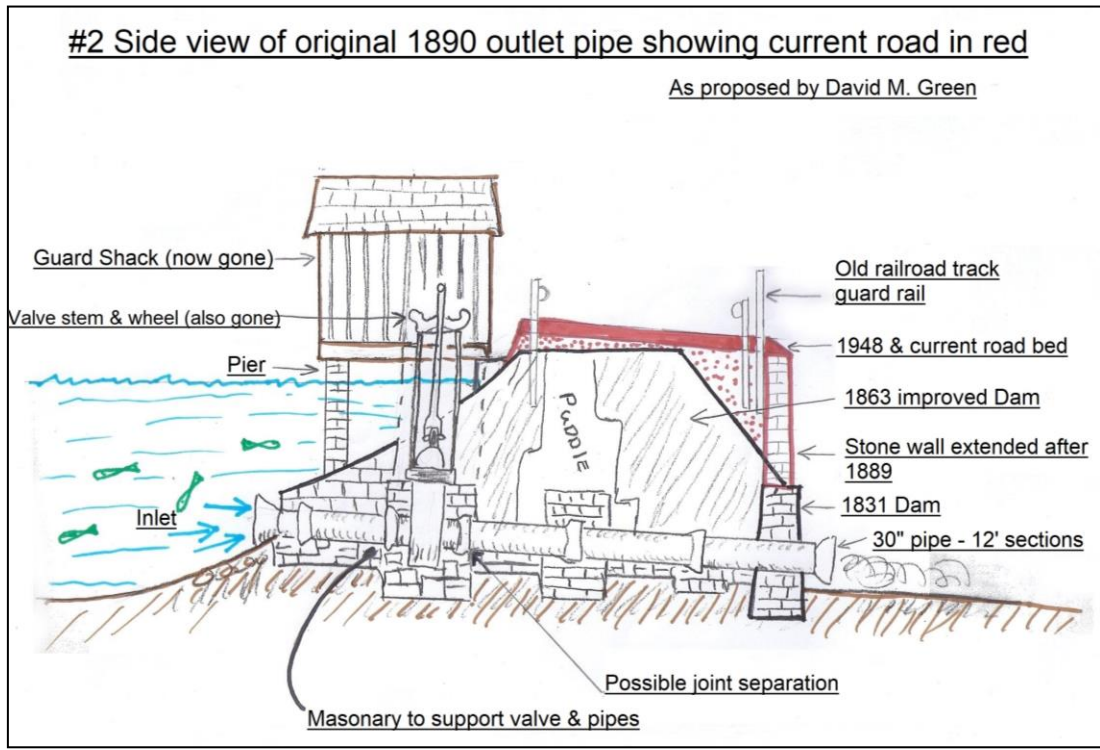
Diagram shows the method of joining two cast iron pipes. While this joint formed a leak proof seal, it was not mechanically strong. That is why the pipes were supported and sometimes surrounded with a masonry base. Rember, these are 30" diameter cast iron pipes.



This drawing shows the 1890 cast iron pipe under today's road. It shows the original location of the Guard Shack and Valve. Today the Shack is gone, the Valve stem is laying on the bottom of the lake, and the outlet pipe is capped off.



Below is a cross section of the drawing above. Looking South.



There was a hole in the floor of the Guard Shack to allow the valve stem into the shack. We believe the continual pressure, over the years, from snowplows pushing wet heavy snow from the road onto the front and south side of the shack was pushing the shack slowly towards the north, and towards the lake. This was putting pressure on the stem which was connected to the valve. We believe the pressure was also pushing on the wooden floor beams and piers which supported the lake side of the shack. We believe this pressure also began pulling on the pipe joint on the west side of the valve. Then in the 80's, when plowing the road from one final snowstorm, the snow hit the Shack and pushed the shack off its pier, and it fell into the frozen lake, dislodging the torque tube and valve stem as it went. After that, the pipe was continually leaking water back towards the Wynantskill.

A small group of concerned Burden Lakers¹ got together and came up with a plan. They made a cover plate and collars which could be bolted over the flange on the outlet (west) side of the pipe. The cover plate had 24 bolt holes drilled in it. They used long pieces of threaded rod and a gasket and gradually drew the cover plate up against the flange. This successfully stopped the leak and is still in place today.

Picture shows outlet pipe before the cap was installed with water discharging from the pipe.



Photo courtesy of Sean Baldwin

¹ As far as we know, Mark & Craig Cioffi, Paul Ashline, Bo Weidman, Steve Scarlata, and Peter Lindley

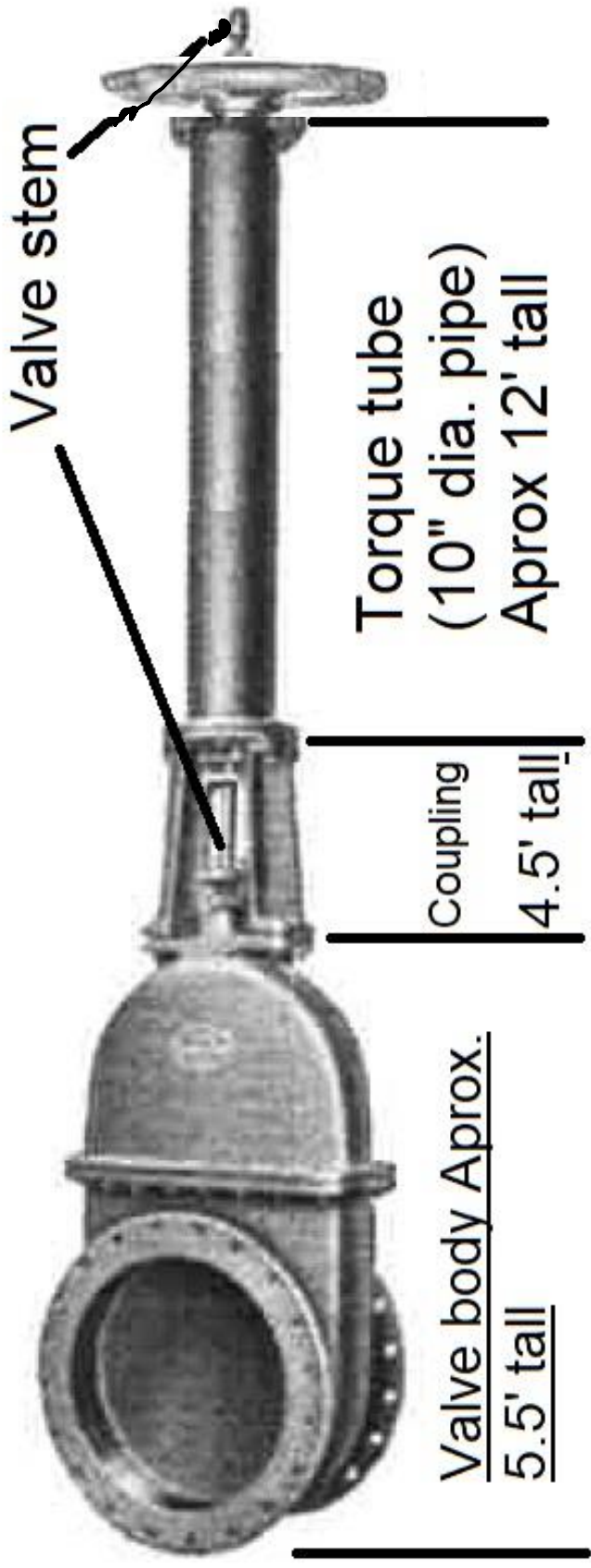


Picture shows cap installed on the outlet pipe.

Photo courtesy of Wayne Pratt

Legend has it, once the cap had been installed and stopped the leaking, Mr. X. supposedly got his tow truck and wrapped a rope around something (might have been the valve stem) and attempted to pull the valve up to see what the matter was, and to attempt a repair. Whatever he hooked onto was too heavy for his tow truck to lift so he gave up. If you look at the drawing, the inlet pipe (he might have hooked to) was supposed to have been installed in masonry and it was buried in dirt. No wonder it couldn't be lifted! The valve body and stem extension are very heavy and no matter what Mr. X. hooked onto, I doubt a tow truck would have had the capacity to lift it, even if the joint had separated and the masonry had fallen away.

On 5/4/24, the BLPC hired a scuba diver to go into the First Lake to find the valve stem and whatever else could be seen. Scuba diver, Tim VanDuesen, entered the water at about 9:30 am. He found the valve, with wheel intact, about 20 feet from shore in 10' of water. He could not locate the inlet pipe and thinks it silted in. The torque tube and valve stem were not attached to the valve body. They did not appear to be broken; the bottom of the torque tube was smooth as if it simply came out of a slide coupling. There were two ropes already tied to the wheel. (from when Mr. X. tried to lift it with the tow truck) We attempted to bring the torque tube, complete with valve stem and wheel, closer to shore. We connected a chain and come-along between the wheel and a good size tree on shore. Try as we did, (we could move it some but), it refused to come into shore so we could examine it.



Here is a Ludlow gate valve from the same era. It shows a 12' valve extension. The part that looks like a pipe at the top is the torque tube. The valve stem is inside the torque tube. This is what appears to have separated from the valve body which we attempted to bring to shore.

Pictures from the dive.



Tim VanDuesen



Tim VanDuesen in water, Larry McKeough & Paul Ashline trying (unsuccessfully) to pull the valve extension stem up to shore.
Photo- Wayne Pratt



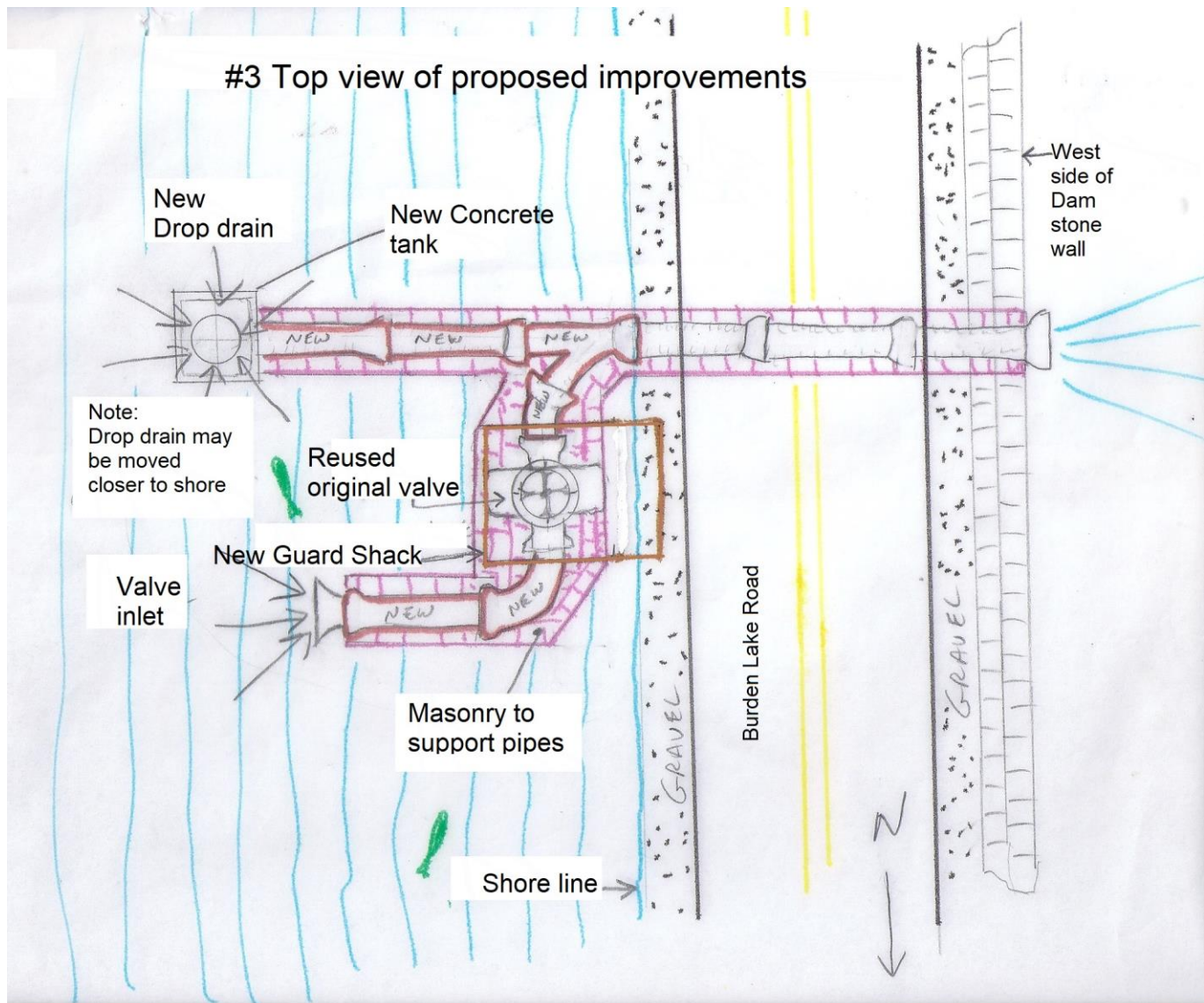
Underwater photo we believe of the valve stem top protruding through the operating wheel.



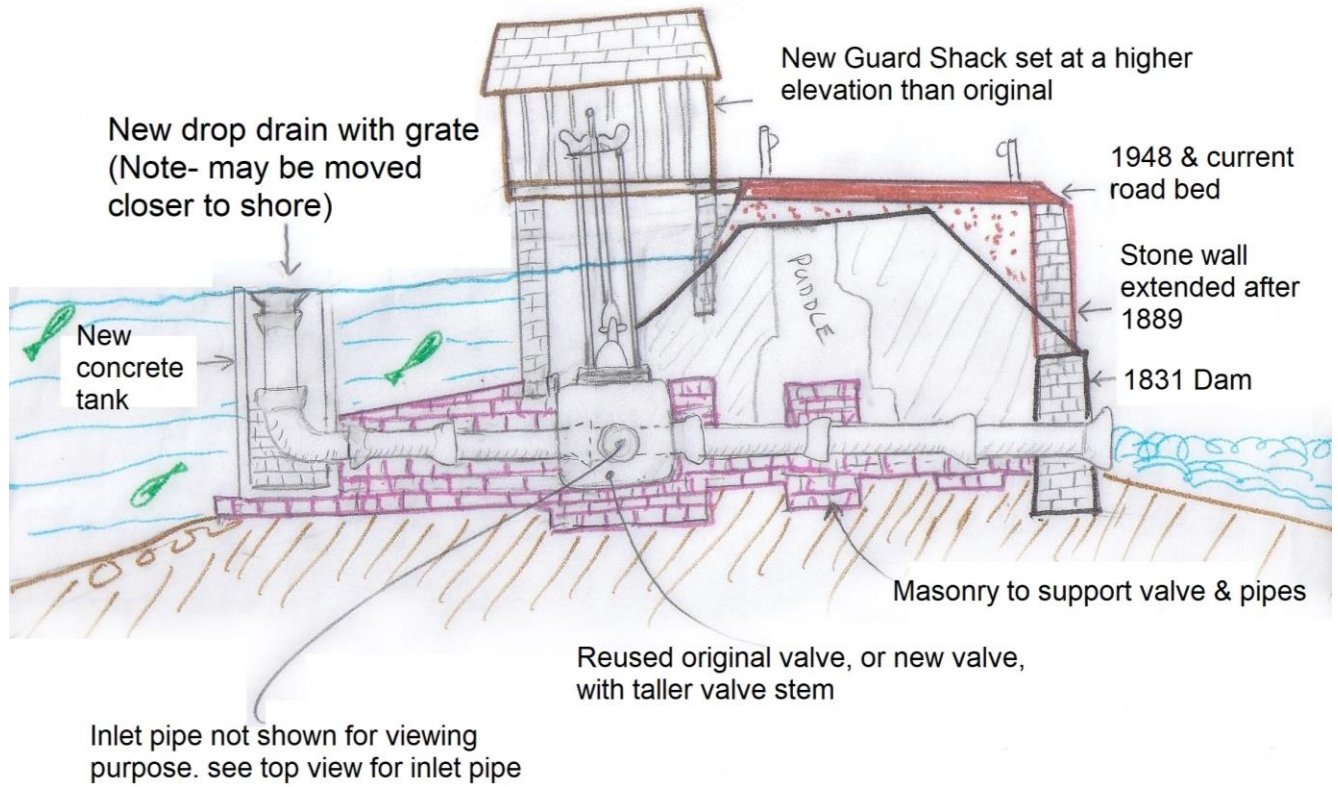
Underwater photo we believe looking through two of the operating wheel's spokes.

Since 2021, the BLPC has been in the process of applying for a \$4.3 million dollar grant to repair/replace the entire Dam System as needed. One of the things to be repaired/improved is the Valve. The BLPC has a diver coming in April/May 2024 to get a good look at the conditions of the valve and take photos if possible. We have been in contact with Mr. Andy Ross, owner of Ross Valve in Troy, who is very knowledgeable with Dam Systems and seems interested in helping us with the repair of the valve. What a great tribute it would be to his ancestors if Andy can keep the 1890 Valve working into the future!

Below are proposed drawings of what we believe needs to be done. First, we would repair the old valve and connect it just north of the exit pipe via a couple of elbows as shown. Next, we would install a new Drop Drain (set at the historic elevation of the water) inside a new concrete enclosure with a grate on top. The Drop Drain would help maintain the lake level at its normal level 24/7, and the Valve would allow us to lower the water when needed. Finally, we would construct a new Guard Shack to secure and protect the Valve and build a platform that leads to the Drop Drain to make it easy to unplug should there be any problems.



#4 Side view of proposed improvements



Research

Wayne L. Pratt and Larry McKeough 2024

Drawings by Larry McKeough

References

Robert J. Lilly, *The Wynantskill: a small stream but mighty*

David M. Green 1889 19- page *Dam Assessment for Wynantskill Improvement Association*

Hart-Cluett House Museum – 8 boxes of *Wynantskill Improvement Association corporate papers*

This booklet presents a hypothesis of what might have caused the demise of the Guard Shack and Valve. We can't be 100% certain.

The information and drawings regarding the Dam and outlet pipe are, to the best of our knowledge, historically accurate. If anyone has additional information, please contact us and we will update the information in this booklet. As we get additional information, and firsthand observations from scuba divers inspecting the outlet pipe, we will revise and update this booklet.

You can contact us at : BLPCLAKE@GMAIL.COM

This booklet is 1 in a series of 5 booklets written by the Burden Lake Preservation Corp. Please see all our booklets on the BLCA WEB Page (<https://www.theblca.org/>)

Plus, the 27-page pamphlet titled “Why are you here?” mailed to all 310 lake front property owners in March 2024

Why are you here?
I am here because of Burden Lake.

Why is Burden Lake here?
Because of the Dam System.

The deterioration of Burden Lake's 150-year-old Dam System threatens the future of the three lakes as we know them. Learn what failure of the Dam System could mean for the lake and property owners, and what you can do to help preserve the lake and protect your interests as a lakefront property owner.

This document was developed by the Burden Lake Preservation Corporation (BLPC) to provide information about the Burden Lake Dam System to property owners and to anyone who enjoys the lake.

The Burden Lake Dam System:

1831 - 2024

by Larry McKeough

in conjunction with The Burden Lake Preservation Corporation



Elevation and Bathymetric survey measurements around Burden Lake.

by Larry McKeough

in conjunction with The Burden Lake Preservation Cooperation



The Woods development at Totem Lodge Burden Lake 2020 - 2023

by Larry McKeough

in conjunction with The Burden Lake Preservation Cooperation
and
The Burden Lake Conservation Association



The Burden Lake Preservation Corp.

History, Book of Deeds, and Incorporation papers

by Larry McKeough

in conjunction with The Burden Lake Preservation Cooperation

