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Getting Your Minds into the Gutters: Some Amesbury Wastewater Treatment History

by

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September 8, 2018

Getting Your Minds into the Gutters:
Some History to Prepare You for Touring Amesbury's Water Pollution Control Plant

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This presentation was developed to give those touring the Amesbury sewage treatment plant on September 8, 2018, some background on the history of Amesbury's sewer system.

Night Soil Carts

19th Century Sewer Pipe (Baltimore)

During the year just past the Board [of Health] has enforced a regulation requiring night-soil carts to be provided with hermetically sealed barrels. In this manner we have removed from our streets one source of annoyance. During the summer and autumn months this work is done between the hours of 9 p.m. and 7 a.m.

From the Amesbury Town Report of 1898

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Before sewage traveled in pipes. It traveled through the streets in barrels. This picture is from Baltimore, but Amesbury also had night soil carts. The night soil men would clean out the vaults underneath the outhouses in the town.

Night soil carts served Amesbury in the late 19th century and were regulated by the Board of Health, which ordered them to work only at night during the warm weather

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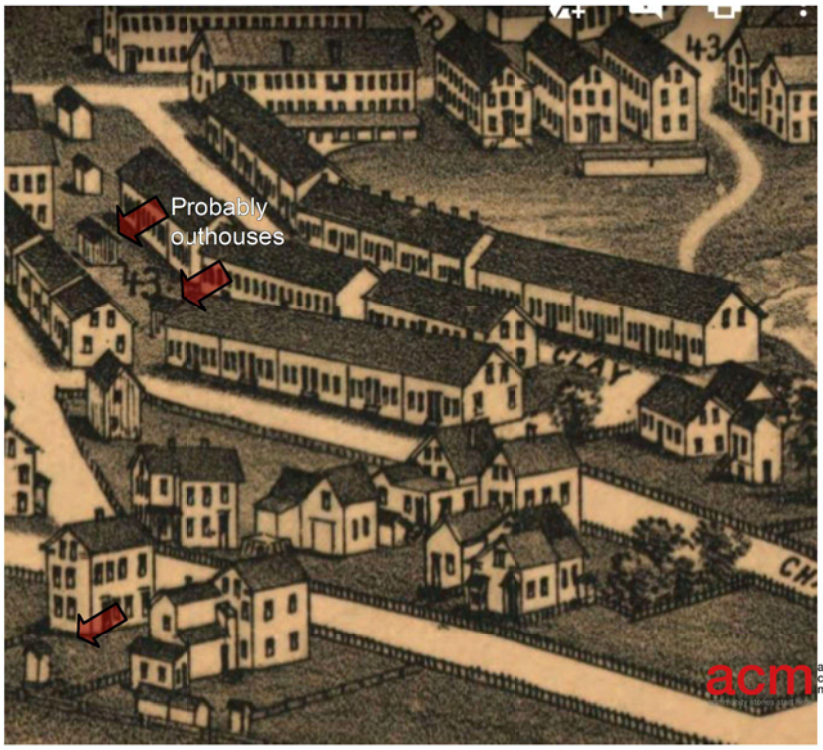
Now, we associate outhouses with farmhouses and camping, where population density is light.

When people lived close together without plumbing, the problem of human waste and water used for cooking, cleaning, and bathing could be a serious health problem.

This picture is from a New York City tenement. But . . .

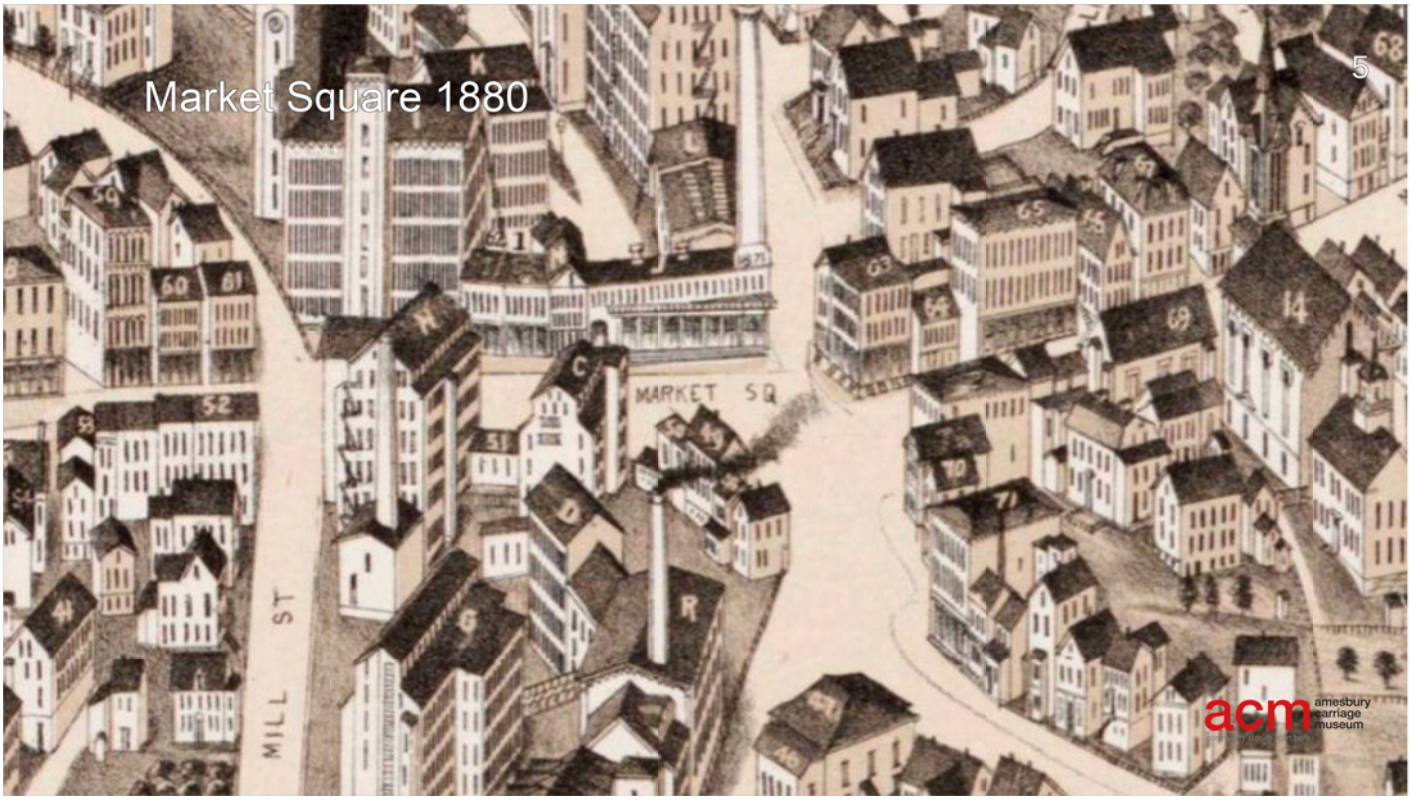
Hamilton Manufacturing

Employee Housing – 1890 Aerial Map



This picture from an 1890 map shows the density of Hamilton Mills worker housing in Amesbury on the shore of the Powow.

And while there are clearly outhouses behind the houses in the lower left, the map also seems to show some outhouses for the workers.



But sewer systems do not begin with human waste: they begin with drainage ditches handling storm runoff, become gutters when streets are paved, and are buried underground when they become unhealthy and unsightly.

There were sewer pipes in Amesbury in the mid 19th century, but they were not laid out with any overall plan in mind, and at least one ended up dumping its contents in the middle of a field.

The Amesbury Board of Health frequently complained in its annual report about the need for a comprehensive plan for handling what they called “sewerage.” In 1886 and 1887, the town commissioned two reports on sewerage, one for each side of the Powow.

PROPOSED SEWERAGE SYSTEM,

TOWN OF AMESBURY, MASS.

Report Jan. 1888.

I have divided the system into four sections, giving four points of discharge: one very small section to be discharged into the Powow River, at Pond Street; one at Water Street; **but by far the largest portion into the Back River, under the railroad track, in the rear of Folger & Drummond's buildings,** and the fourth outlet through the railroad culvert, south of the roundhouse.

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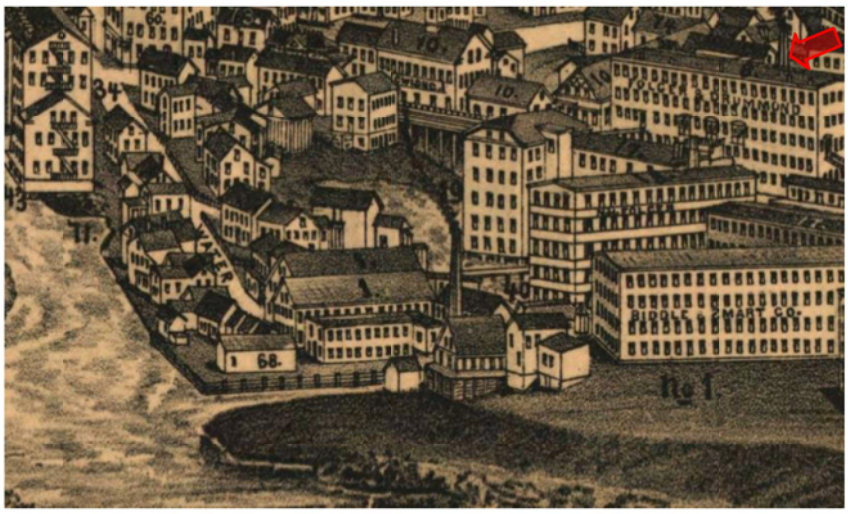
To get an idea of what sewer planning was like in the late 19th Century, we'll take a look at the Allen plan for east side of the Powow, the former Salisbury Mills area that became part of Amesbury in 1886.

Four sections discharge untreated sewage into the waterways. Note most goes into the Back River "In the rear of the Folger and Drummond buildings."

Back River into Powow 1890



Folger and Drummond

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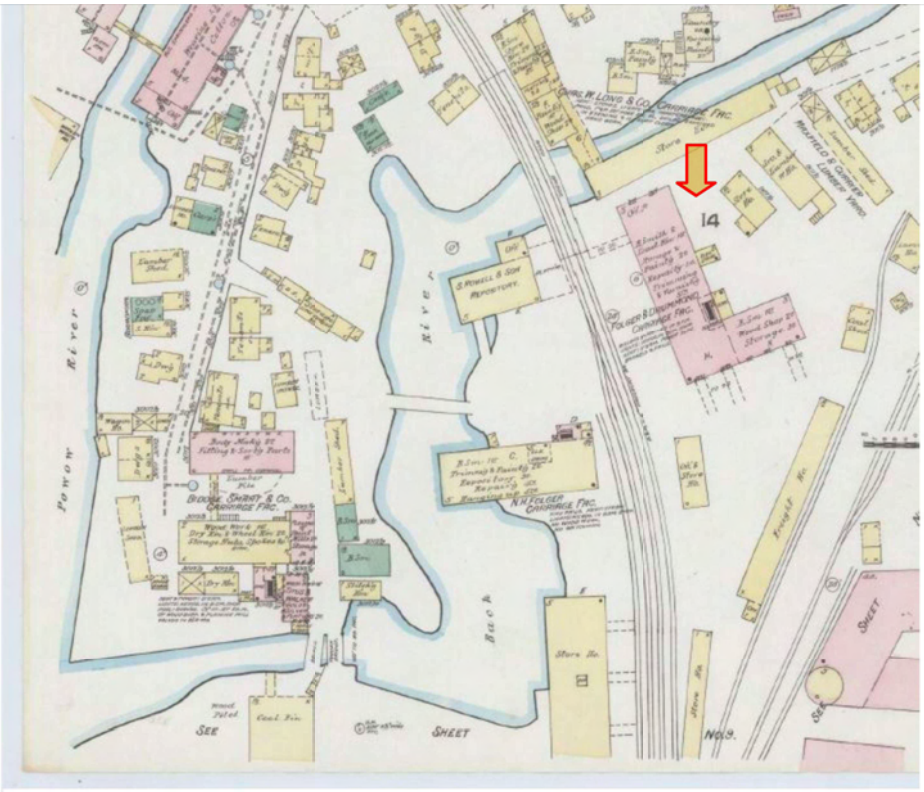
What we call the Lower Millyard was much more congested in 1890 than it is now, and the Back River was surrounded by carriage factories and other buildings. The Folger and Drummond factory is at the back of this aerial view map.



1890 Sanborn Insurance Map

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The arrow marks the main Folger & Drummond building.

This map also shows how the Back River bulged to form a reservoir where the flow would slow up, and the sewage could accumulate.

PROPOSED SEWERAGE SYSTEM,

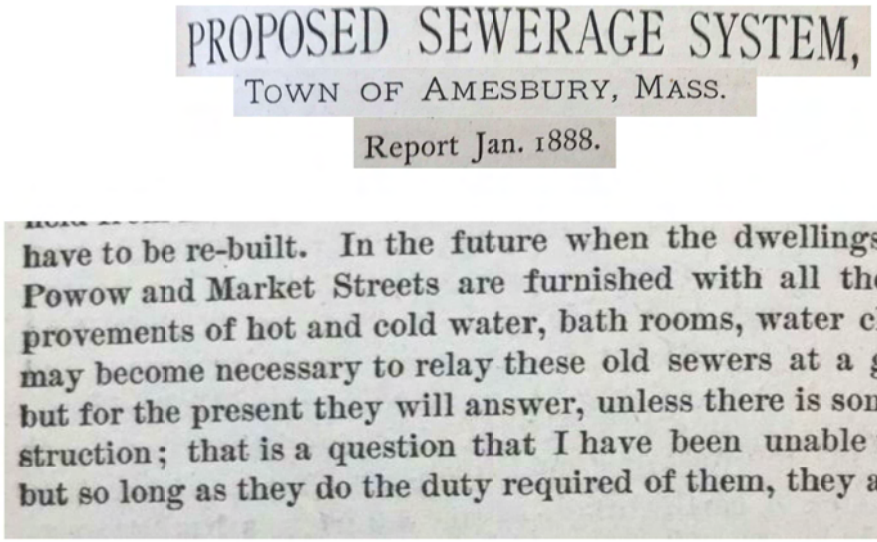
TOWN OF AMESBURY, MASS.

Report Jan. 1888.

The Pond Street outlet should be extended about twenty feet to the channel of the river, where the rapid current will carry away all sewerage at once. The Water Street outlet discharges directly into the current, and will be carried at once. **The rise of the tide in the Back River will stir up any sediment that may be deposited during low tide, and when the tide falls it will take this sediment along.** It will be many years, and your population will have to be very largely increased, before you can possibly have any from the fouling of the streams with sewerage . . . .

Of course, like the Powow, the Back River is affected by the tide, and the plan made use of the twice daily tide to “flush” the river clean.

The State of "Indoor Plumbing"



PROPOSED SEWERAGE SYSTEM,

TOWN OF AMESBURY, MASS.

Report Jan. 1888.

have to be re-built. In the future when the dwellings along High, Powow and Market Streets are furnished with all the modern improvements of hot and cold water, bath rooms, water closets, etc., it may become necessary to relay these old sewers at a greater depth, but for the present they will answer, unless there is some faulty construction; that is a question that I have been unable to investigate but so long as they do the duty required of them, they are all right.

They included some of the old sewer pipes in the plan, but were aware at the time, that waste management was in a time of transition.

Problems Noted in the Board of Health Report of 1898

The soil above [Whittier Ave.] is full of water, so that in the spring and after heavy storms it filters into the vaults and cellars. **The vaults overflow, producing so many nuisances,** and the cellars remain wet making so many unhealthy tenements. With this line of sewerage laid **outside vaults could be discontinued, [water] closets put in the houses and connected with the sewer**.

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But no comprehensive sewer plan was implemented in 1888 and 10 years later, the old ways of doing things were still causing problems, as this complaint about overflowing outhouse vaults shows. It also shows how noxious material was making it way into the storm sewers.

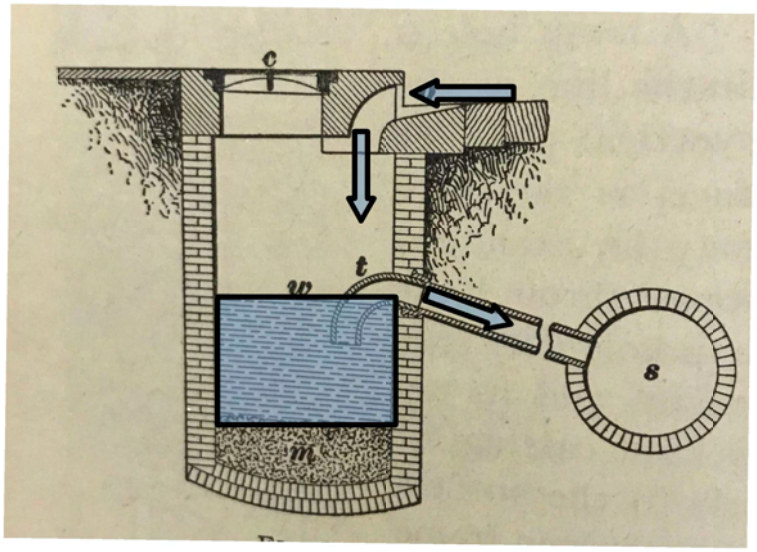
But the new plumbing technology solved some problems, it also required some adaptation, as new technology always does.

For example,

The 1897 *Report of the Committee on Sewerage* noted many

the sewers in the business district stunk.

Beneath sewer grates are catch basins, which gather debris



For example, people needed to learn about the importance of traps to control sewer gas.

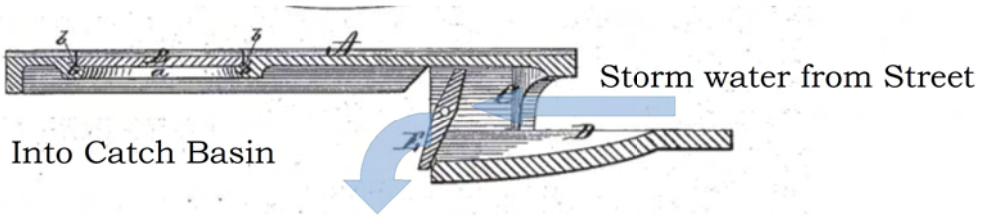
The sewers smelled because rain runoff and gray water from sinks ran in the same sewers. And the grates in the street (even today) have basins in them that allow things that might clog the pipes to settle out before the water goes into the sewer system.

Separating waste from runoff will eventually become part of the comprehensive plan.

But in 1897, the Board of Health had traps installed in the street sewers.

Example of a Catch Basin Trap

Example of an automatic sewer trap (1872)



"As the water runs into the bucket the trap opens and lets the water through, shutting tightly again so the gasses from the sewer cannot escape. . . ."

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They explained their operation in the same report.

However,this solution created another problem:

"A tour of inspection of the buildings, along the streets where automatic traps were placed, was made to see if all sink, bath and laundry tubs were properly trapped, for **if the sewer gasses were confined to the sewers the gas would find its way into the houses through untrapped sinks and tubs**."

60 needed traps.

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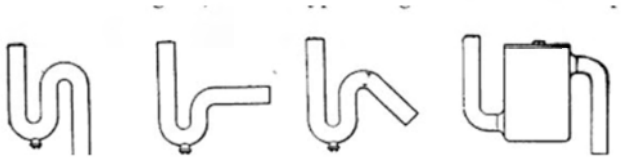
The sewer traps solved the problem, but also created another.

When a drain is attached to a trapped sewer system,the sewer gasses, which are unpleasant and can make you ill, can enter the home through the drain.

Preventing that is what the trap your sink or tub or toilet does. It is clear that not too many folks understood this concept since 60 or 2/3rds of the sinks had no traps .

Plumbing Technology: Traps



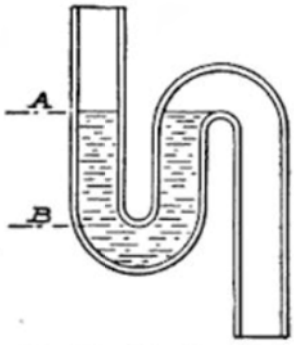


Fig. 32.—The Trap Seal.

Perhaps you thought, as I did when a child, that the trap was for catching your ring if it went down the drain

The basic traps found in sinks and tubs were the S-trap and the drum trap. The water itself blocks the fumes and is cleaned out every time the drain is used.

People needed to get used to being connected.

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Massachusetts State House (c. 1895)

In 1886 the Massachusetts legislature had given the State Board of Health regulatory authority over how polluted waterways could be. This event was a likely one motivator for the Amesbury Sewerage Reports in 1886 and 1887

Amesbury did not implement a comprehensive sewerage plan, but when sewers were laid after 1888, they were created with the plan in mind.

By 1900, the Amesbury Committee on Sewerage was concerned that the State Board of Health would not continue to allow dumping sewage into the Back River. They also feared that legislation was in the making that may force other even more expensive changes if nothing has been done.

Woodfall Engineering Recommended

- Household waste and surface runoff should be separated.
- The town sewerage should be discharged into the Merrimac River, not the Powow.
- Sewerage on the east side of the Powow River should be brought across to the west side and run down to the Merrimac.
- The entire area should be able to be provided for by gravity.
- Estimated Cost: $113,000 ($3.35 million in 2018 dollars)

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While the old reports contained sufficient surveys of current conditions, they needed a new plan and hired McClintock and Woodfall to draw it up. These five points key to the plan, which was approved.

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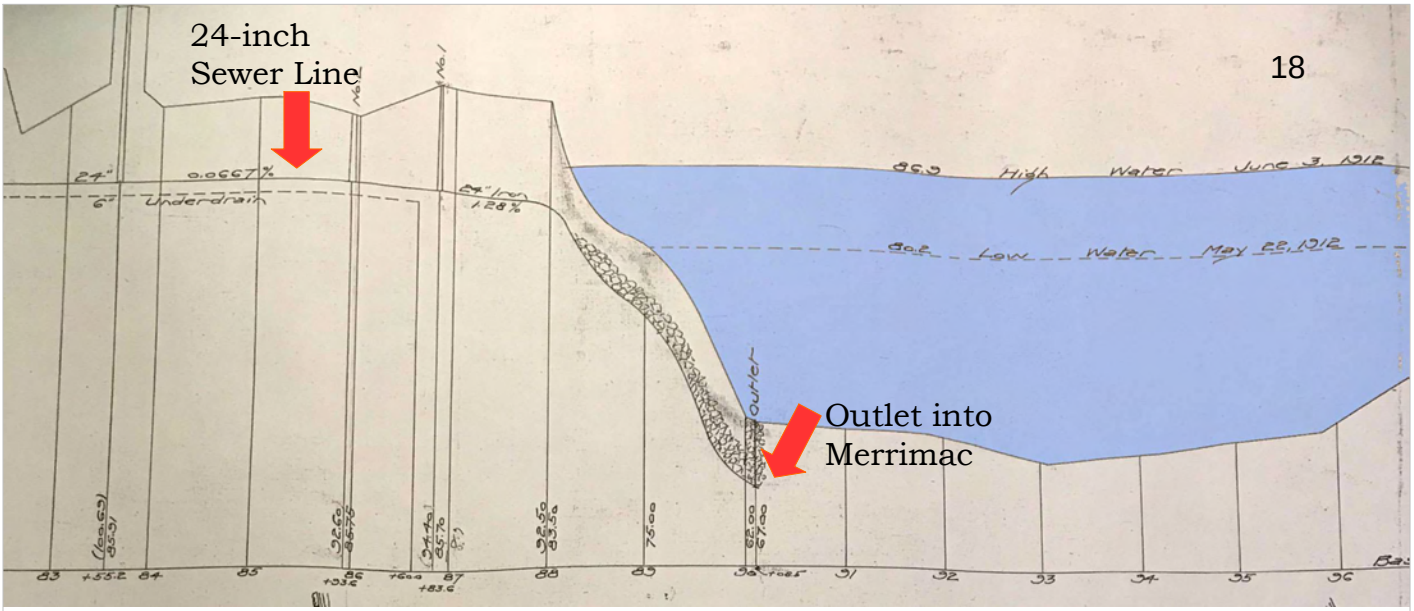
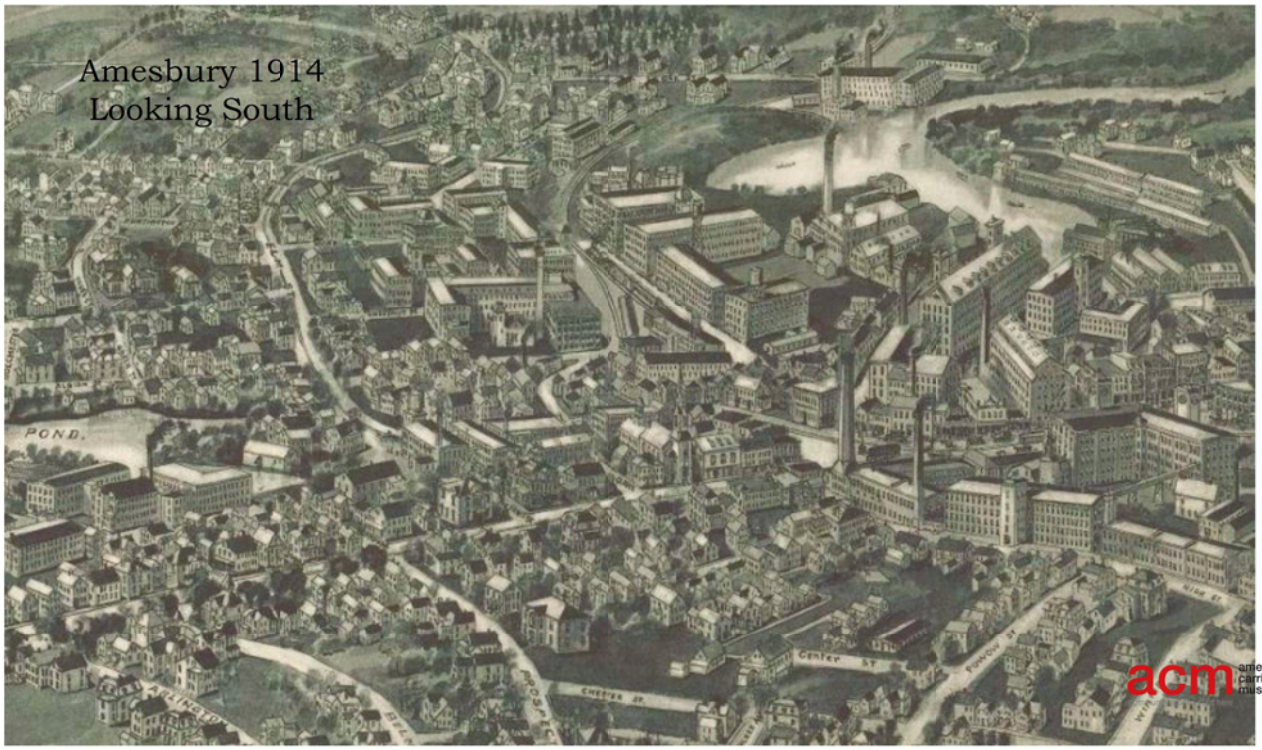


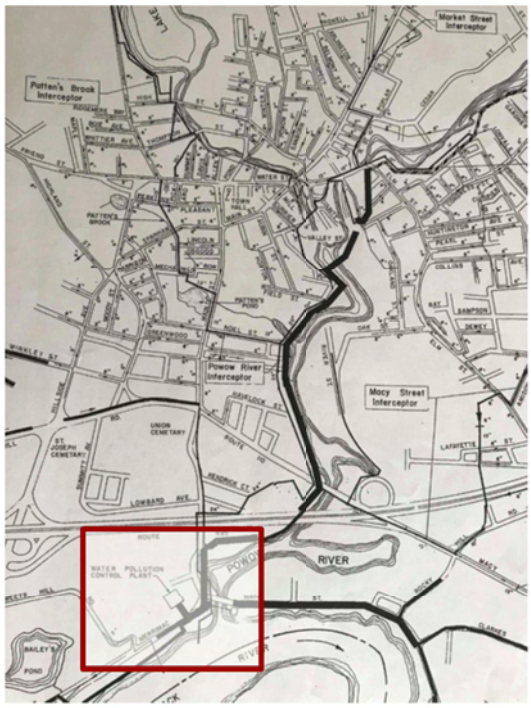
Cross Section View of the Main Outlet into the Merrimac River (1912)
McClintock and Woodfall

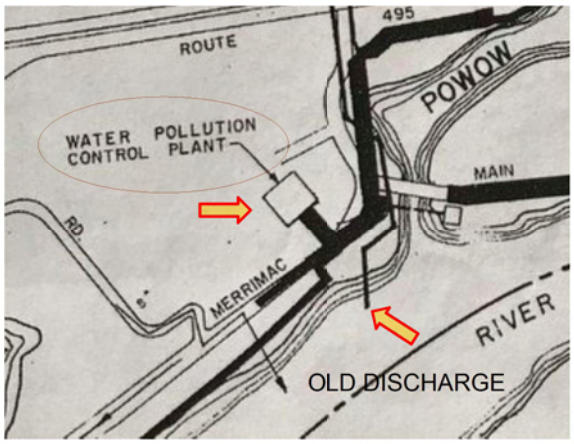
The Main sewer line roughly followed the Powow, picking up branch lines as it went until it arrived at the Main Street Bridge where it dumped Amesbury's untreated sewerage into the Merrimac River and waved a fond goodbye as it flowed downriver to Newburyport.



By 1914, the sewer committee could report sanitary sewers were installed for a large portion of the town. And with adjustments and revisions, this approached lasted for about 60 years.

Under pressure from the Clean Water Act of 1973, the US started cleaning up its waterways, and Amesbury did its part, opening a Pollution Abatement Facility in 1976.





Proposed Intercepting Sewers
Water Pollution Abatement
Facility Revised January 1977

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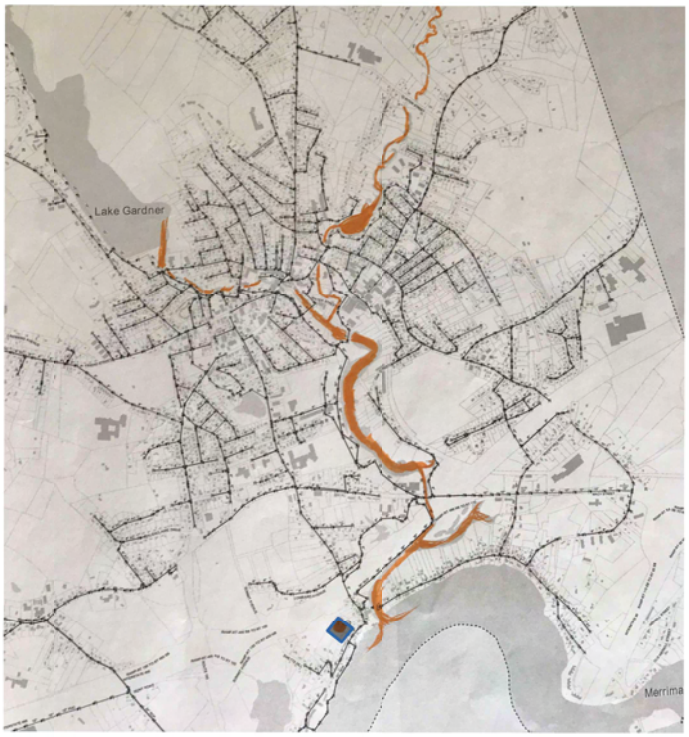
The map is of the proposed, new intercepting sewers (the wide black lines). Whereas the old system ended up in the Merrimac, the new system ends at the Water Pollution Abatement Facility .

Since the plan back in 1901 had the foresight to direct the sewage to a single point of discharge, the shift from discharging raw sewage to discharging detoxified water was made easier.



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Map of Current Amesbury, MA Sewer System

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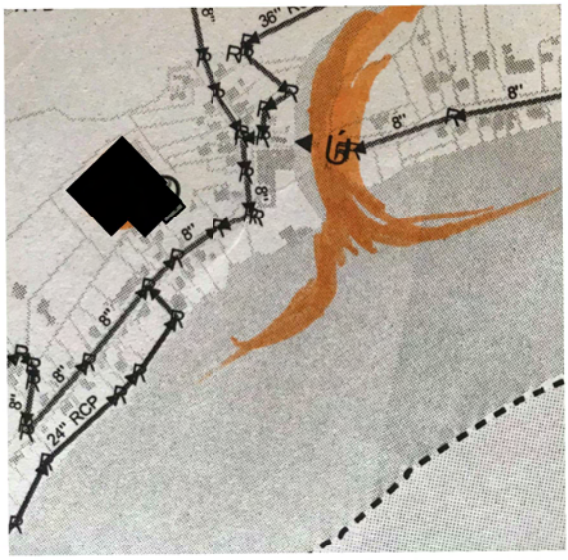
Here is today's sewer system. The waterways are gold.



Our system is the result of a combination of chance and planning, integrating old and new solutions.

When you visit the plant you should be aware that you are at the tail end of long standing human activity.

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