EASTERN YORK COUNTY SEWER AUTHORITY

Wastewater Treatment Plant

Biological Nutrient Reduction (BNR) Upgrade done 2012

Plant Location: 400 Friendship Avenue in Hallam, PA

Business Office: 46 Walnut Springs Road, Hellam, PA 17406-9000
Phone: 717-252-2797

Brochure compiled 2014
Board Members Updated 2016

History & Financial Information: Eastern York County Sewer Authority (EYCSA) is a Joint Operating Authority formed by Hallam Borough and Hellam Township and incorporated in 1973. Each municipality appoints three people to the Authority. Monthly Board Meetings are held on the fourth Monday of each month unless that falls on a holiday, in which case the meeting is on the 3rd Monday of the month.

The original plant, constructed in 1985, began operating on January 6, 1986 with a capacity of 200,000 gallons per day and a collection system of 41,092 linear feet of piping ranging from 4" to 18" diameter, having been built at a cost of about $3.96 million to serve up to 600 properties in Hallam Borough and portions of Hellam Township just west of Hallam Borough. Because additional treatment capacity was needed in 1998 the plant was expanded and the capacity increased to 500,000 gallons per day and now serves 1,685 units, operating at less than half capacity. The collection system is now at a total of 102,286 linear feet as a result of several expansions in Hellam Township, still west of Hallam Borough to Old Church Lane, Commerce Way, Runway, a portion of Shoehouse Road, and Crestwood East. Areas in the east end of Hallam Borough along Cherry Avenue, North Wilson Lane (1991) and East Beaver Street (1994) that were originally not serviced were added in the years noted.

In preparation for the 1998 expansion a $4.7 million bond issue was put together in 1996. To take advantage of lower interest rates, in June of 2004 the bond issue was refinanced with a $3.5 million bank note. The 2004 bank note was refinanced in November 2010 with a $5.5 million bank note for the DEP mandated upgrade for the Chesapeake Bay discharge limits reduction that cost $3.5 million of the $5.5 million refinancing. Both Bank notes were with Fulton Bank at an interest rate of 3.99% for the 2004 note and 3.99% for the fixed potion of the note and 2.85% for the variable rate portion in 2010. EYCSA has a onetime option to refinance the variable portion if the interest rates increase. State grants for the original construction totaled $1.6 million. The only additional assistance EYCSA received was $240,705 from the Act 339 Grant that was discontinued in 2003 when funds were diverted to the Growing Greener Program administered by the DEP.

Since the first ever quarterly sewer rental rate increase in January 2013, EYCSA has an annual budget of $1 million. 43% is budgeted for Plant & Collection System Operations, 18% for Administration, 24% for debt interest and principal payments, and 15% for capital planning. In reality, historically 20% has been spent for Plant and Collection System Operations, 6% for Administration, with the remainder spent on debt interest and principal payments and capital planning.

In order that the bank note interest and principal can be paid and the day-to-day operating expenses met, EYCSA must necessarily operate the

Authority as the business it is. However the bottom line of that business is; not profit, rather it is the protection of our drinking water, our streams, and our rivers**.**

Quarterly Sewer Rates: EYCSA has three rate district, depending on when the collection system was constructed. The rates for the original district constructed in 1985 are $130.50/quarter for residential units and $201/quarter for non residential units. The second district constructed in 1993 is the Hellam Industrial Park on Commerce Way and Runway where the rates are $291/quarter, and the area south of Rt. 462 and extending to Crestwood East constructed in 1994 where the rates are $196/quarter. These rates are based on 21,000 gallons of water usage per quarter as reported by the York Water Company with a surcharge for additional usage. There are a few customers with well water who have water meters to measure the usage. Except for the January 2013 rate increase, EYCSA has not had to increase rates because of careful money management but also because most EYCSA's customers pay their quarterly bills on time and EYCSA has a systematic collection system for those who do not.

Plant Discharge Limits: The 2011/2012 Chesapeake Bay Upgrade successfully decreased EYCSA's nitrogen and phosphorus to well within the permitted discharge levels. In 2013 EYCSA discharged 41.9% of the allowed nitrogen and 38.5% of the allowed phosphorus.

Board Members: The following serve as EYCSA Board Members:

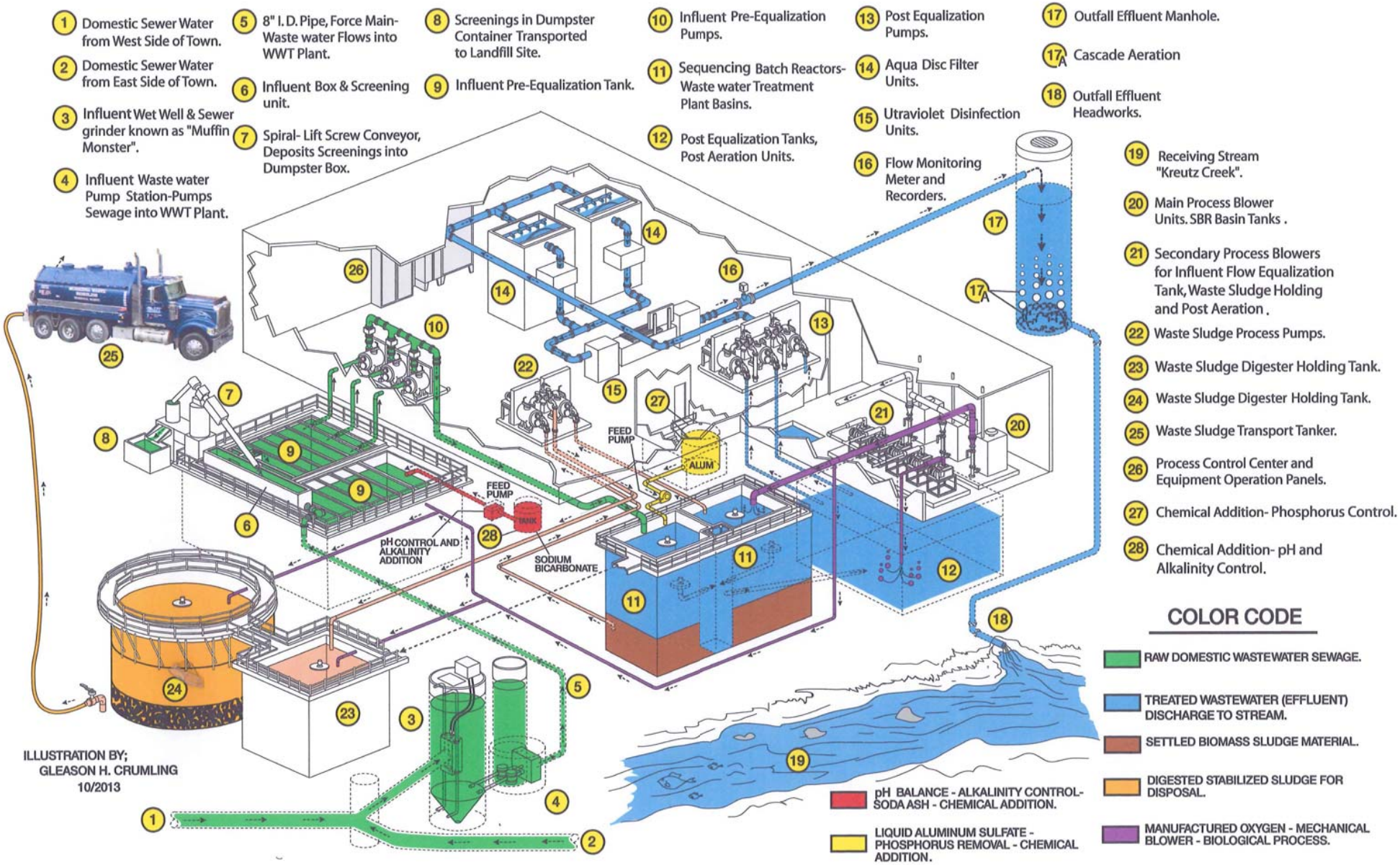
Barry D. Miller, Chairman—appointed by Hellam Township
Glen W. Billet, Vice-Chairman—appointed by Hallam Borough
Charles H. Lauer, Jr., Treasurer—appointed by Hellam Township
Dean D. Mackley, Asst. Treasurer—appointed by Hellam Township
Carl G. Newcomer, Jr. Secretary—appointed by Hallam Borough
Robert L. Schlosser, Asst. Secretary—appointed by Hallam Borough

Consultants: EYCSA has contracted with George E Christine III, dba George Wastewater Treatment Services for plant operations since August 1985. Prior to that Mr. Christine assisted in the planning and construction of the treatment plant.

EYCSA has contracted with C. S. Davidson, Inc. to do the engineering work, done by John A Klinedinst, PE & Richard G. Resh. Jon Countess Esq., originally with Laucks & Monroe and then CGA Law Firm, has been contracted to do legal work. Both have been contracted since the start in 1973.

Etc: The treatment plant is located in Hallam Borough on Friendship Avenue. The EYCSA business office is located at 46 Walnut Springs Road, Hellam, PA, 17406, in the Hellam Township Building. The office is open from 9 a.m. to 12 noon Monday through Friday except holidays and has been staffed by Jutta Creager since November 1997.

EASTERN YORK COUNTY SEWER AUTHORITY - WASTEWATER TREATMENT PLANT



Please follow the numbers to follow the wastewater through the treatment plant from entry to discharge and turn to the next two pages for more detailed information. The computer artwork was done by EYCSA Board Member, Gleason H. Crumling, the technical information was provided by George E. Christine III, and proofreading was done by Richard G. Resh and John W. Klinedinst, P.E. at C. S. Davidson, Inc.

PROCESS DESCRIPTION

Items #1 & #2 – Domestic Wastewater: Also known as Sewage – discharged from Homes and Businesses conveyed to the Wastewater Treatment Plant through a collection system of pipelines for treatment to reduce and stabilize human wastes and pathogenic bacteria to be discharged to the receiving streams and make it safe for aquatic life and fish and the use by the public for recreation and for human consumption through the recycling of water.

Item #3 – Influent Pump Station Wet Well and Sewage Grinder known as "Muffin Monster" Comminutor: The Muffin Monster grinds large items to make pumping wastewater by the Pumps and Pump Station more effective and prevent clogs in the impellers of the pumps, particularly the pumps in the Influent Pump Station (#4). The Wet Well stores wastewater before it is pumped.

Item #4 – Influent Wastewater Pump Station: This System is comprised of two (2) Pumps located in an underground Control Room with Control Panels and Level Control devices that pump Wastewater into the Wastewater Treatment Plant for processing and treatment.

Item #5 – Ductile Iron Pipeline: This 8" diameter pipeline is a Force Main that delivers Wastewater under pressure created by the pumps in the Influent Pump Station (#4), into the Pretreatment Tanks (Pre-Equalization Tanks (#9).

Item #6 – Influent Box and Screening Unit: This equipment screens and separates the solid materials and removes non-biological materials such as plastic, cotton products, grease and debris that do not break down in the Biological Treatment Plant Process. These materials are removed and disposed of in the form of Garbage at the Landfill.

Item #7 – Spiralift and Screw Conveyor/Screening Unit: The Non-biodegradable Materials as previously described in Item #6 is pressure washed from the Biological Wastes and lifted via a Screw Conveyor System and discharged into a Garbage/Waste Dumpster.

Item #8 – Screenings Dumpster/Landfill Containers: Provided by an approved Waste/ Garbage Contractor for the removed material to be safely contained until the Waste Contractor picks it up to be transported to an approved landfill site for disposal.

Item#9 – Influent Pre-Equalization Tanks: These tanks receive raw Influent Wastewater and hold it until it can be pumped into the Main Wastewater Treatment Tank Units known as Sequencing Batch Reactor Units (SBRs) (#11). These tanks balance low and high flows of wastewater received and balance the flows into a constant rate of flow to be pumped into the SBRs (#11).

Item #10 – Influent Pre-Equalization Pumps: These pumps pump Raw Wastewater into the SBRs at a constant rated flow – or Gallons per Minute (GPM). This ensures that the Tanks are not overfilled so that the proper treatment plant process is adequately accomplished to stabilize the Raw Wastewater provided to biomass, the biological treatment mass of bacteria that breaks down the wastewater.

Item #11 – Sequence Batch Reactor Tankages/Treatment Basins: These basins (tanks) are known as "SBRs", and are the Treatment Units. Raw Wastewater is treated biologically by the bacteria in the biomass, a process enhanced by the addition of air from Blower Units (#20). This is a four-stage process where the air from the blowers is introduced by units called Air Diffusers located at the bottom of the tanks, and the tank contents are mixed mechanically by mixers known as Direct Drive Mixers (DDM), located on the surface, to distribute the oxygen. In this process the Wastewater safely reduces BOD (Biochemical Oxygen Demand) and various forms of Nitrogen from Urine/Urea that is stabilized in the forms of Ammonia Nitrogen, Nitrates, Nitrites, and Total Nitrogen. This happens in the SBR Basins by treating batches of Wastewater with lots of oxygen and then no oxygen. At the end of the

Treatment Cycle of sequencing batches of Wastewater with cycles of Mixing and Aeration, a period of a quiet cycle known as BioMass Settling occurs to separate the mixed solids from the treated liquid. The treated liquid is then discharged from the SBR Tanks to be discharged to the Post Equalization Tank.

Item #12 – Post Equalization Tanks – Post Aeration Tankage Units: The treated Wastewater, also known as Effluent, is discharged to this Tank to equalize the flow rate and increase the oxygen in the Effluent prior to being discharged to the receiving stream. This Tank is used as a Holding Tank, a reservoir so that the Post Equalization Pumps can provide a constant flow to the Filtration Units (#14).

Item#13 – Post Equalization Pumps: These pump Treated Wastewater to the Filtration Units (Disc Filters #14) at a constant rate of flow measured in Gallons per Minute (GPM).

Item #14 – Rotating Disc Filter Units (Filtration Units): These Units, known as Disc Filters, further clean the treated Wastewater known as Effluent prior to it being disinfected by the Ultra-Violet Disinfection Units (#15).

Item #15 – Ultra-Violet Disinfection Unit: This Unit provides Ultra-Violet (U/V) Disinfection via a submerged Light Source that kills any remaining Pathogenic including Fecal Coliforms, a disease-causing bacteria from the intestines of warm blooded mammals, including humans. This unit disinfects (but does not sterilize) the Wastewater/Effluent so that it is safe for fish and other aquatic life and public and recreational uses.

Item #16 – Flow Monitoring/Recording Unit: This unit measures and records the amount of Effluent Wastewater being discharged to the receiving stream. These readings are reported monthly to the regulatory agency, the Pennsylvania Department of Environmental Protection (PADEP)

Items #17 – Outfall Manhole & Item, 17A– Cascade Aeration & #18 – Effluent Headworks: Treated Wastewater Effluent flows to the manhole and falls to the Discharge Pipeline (between #17 & #18) to the receiving stream, a Kreutz Creek tributary from where it flows into Kreutz Creek. The effluent's fall to the bottom of the manhole provides additional mixing action that adds oxygen to the effluent being discharged into the stream.

Item #19 – Receiving Stream – "Kreutz Creek": The water in Kreutz Creek flows into the Susquehanna River, which eventually flows into the Chesapeake Bay.

Item #20 – Main Blower Units: These units provide mechanically compressed oxygen that is pumped into the Main Treatment Process SBR Units (#11).

Item #21 – Secondary Process Blower Units: These units provide the same type of oxygen as described above for secondary treatment units such as the Flow Equalization Tanks (#9), Waste Sludge Holding and Digestion Tanks (#23 & #24), and Post Aeration Tank (#12).

Item #22 – Waste Sludge Pumps: These pumps transfer treated waste sludge from the SBR Tanks (#11) to the Waste Sludge Holding and Digestion Tanks (#23 & #24).

Items #23 & #24 – Waste Sludge Holding and Digestion Tanks: These tanks provide further stabilization and storage of sludge in an aerated condition until it can be disposed of at approved disposal sites.

Item #25 – Waste Sludge Transport Tanker: This tanker pumps and transports stabilized sludge to an approved disposal site for agricultural land use or dewatering, and composting.

Item #26 – Process Control Center/Equipment Operations Panels: This equipment provides power and control of treatment plant units.

Item #27 – Chemical Addition-pH, Phosphorus, Alkalinity Additions: These provide chemicals to the process to enhance treatment including removal of phosphorus.

What you can do to lower costs and avoid problems:

- Never introduce pesticides, herbicides, toxins, paints, grease, petroleum-based substances, rubber items or any non-household wastes into the sanitary sewer.
- Do not discard items such as handy wipes, swiffers, cotton swabs, feminine hygiene products, diapers, bandages, paper towels, dental floss, hair, coffee grounds, or pet waste and kitty litter. These items do not disintegrate. Disposable does not mean flushable.
- Maintain your building sewer. The building sewer is the sewer line inside the structure, together with the line that extends from the structure to the public lateral on the street side of the clean out usually at the property boundary. The clean out is the round cover plate located at grade. A frequent maintenance need is replacement of the cap on your sewer line clean-out. One is located near the house and the other at the property line as noted above. These caps can be damaged by a lawn mower, removed by vandals, or otherwise turn up missing. Replacement caps can be purchased at hardware stores and plumbing supply houses. An open clean-out allows rainwater to enter the sanitary sewer system and is an entry point for the introduction of foreign objects that can clog your building sewer and end up costing you much more than the price of the replacement cap.

Sewer History from the PA Rural Water Association: Mohenjo-Daro, a town of 35,000 in the Indus River Valley (southern Pakistan) is considered by many historians to be the birthplace of sewers. Beginning around 35000 BCE, drains made of cut stone or man-made masonry units that were used as surface drains in the ancient world. Pipes were developed about the same time in Babylon (Iraq) from sun-cured and later baked cotta pipe. Cast iron pipe was used as early as the 1600's in France and after several plagues in Europe, Paris was one of the first cities to create a comprehensive sewer system. In the 1860's because of horrific sanitation conditions, London constructed a new sewer system to separate sanitary sewer from storm sewer. In USA cholera and other diseases became a problems after the Civil War and the first new separate sanitary sewer system was constructed in Memphis, Tennessee using 6" diameter clay pipes (without manholes) and later 8" diameter pipes (with manholes). Very early sewer lines in the United States were made from hollowed out logs. The basic design of sewers has not changed substantially since the mid to late 1800's but many pipe materials have been added since then.

This and that:

- Some people believe that the word "sewer" was derived form the term "seaward" in Old English. Early sewers in the London area were open ditches that led to the Thames River, and from there on down to the sea ("seaward").
- The word "manhole" initially had nothing to do with sewers but was used to describe the access holes between decks of old, all-male, sailing ships.
- Manhole covers initially were slabs of stone or maybe pieces of wood until replaced by cast-iron manhole covers used now.

Last but definitely not Least: Treatment plants need to be operated and maintained, daily and/or weekly laboratory testing done, and records kept. This is done by the Plant Operator. Currently there is a shortage of Plant Operators and this shortage will worsen as the 68% of operators over the age of 51 retire. The work is certainly more involved than letting the effluent go "seaward"; however, there is a lot of variety to the work and very importantly, the job cannot be outsourced.