VILLAGE OF PADDOCK LAKE
SANITARY SEWER SYSTEM USER EDUCATION PROGRAM

Purpose

The purpose of the sanitary sewer collection and treatment system education program and quiz is to educate the stakeholders and users of the sanitary sewer system of its proper use and care.

By completing this sanitary sewer collection and treatment system education program and answering the questions in the associated quiz, stakeholders/users will qualify for a $50.00 credit towards their fourth (4th) quarter sanitary utility bill.

Issue

Misuse of the resident owned sanitary sewer collection and treatment system has increased since 2018; the increasing popularity of single-use wet wipes across a variety of applications has caused environmental and economic challenges costing the district $136,000 per year. Due to their convenience and low cost, disposable nonwoven wipes have become a necessity in the lives of many sewer-users. However, stakeholders/users rarely consider the end-of-life of these non-biodegradable products: many sewer-users' flush products that are not compatible with the Village sanitary sewer collection and treatment system and are causing considerable damage and expenses to the owners of the sanitary sewer collection and treatment system.

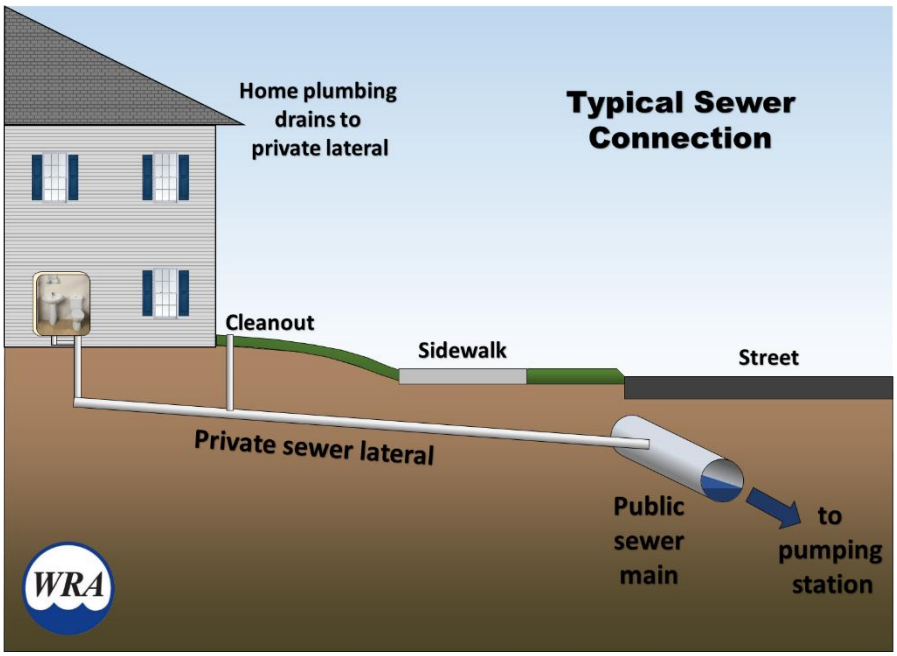
In addition to an increase of cloth and plastic waste being flushed, the Village is also experiencing an increase in food waste, fats, oils, and grease also known as FOG's. These FOGs are the worst culprit in clogging sanitary sewer; introduction of FOGs into the collection system collect and build in size, eventually plugging sewer lines.

Sanitary Sewer System Overview

The resident-owned treatment plant, located at 23201-62nd Street, is an extended aeration activated sludge wastewater treatment facility that receives waste from 1,339 dwelling units, 52 apartments, 87 commercial businesses and 4 public users. The Wastewater Treatment Plant (WWTP) operates under a Wisconsin Department of Natural Resources pollution elimination permit that is closely monitored through monthly reporting of influent and effluent water quality-based effluent limits (WQBEL).

The treatment plant receives waste from the resident owned sanitary sewer collection system; this collection system consists of 16.3 miles of gravity sewer piping and 1.1 miles of pressurized sewer piping that lifts sanitary sewer waste from five (5) sewer pumping stations, commonly referred to as lift stations. The privately owned sewer laterals or drainpipes serving the individual homes and businesses are connected to the collection

system to convey building waste to the collection system and draining to the treatment plant. Private lateral is shown in the photo below.



The Village's first sanitary sewer system was constructed by L.B. Harris and Sons in 1956- originally contracted by the U.S. Department of Defense to construct and develop the subdivision known as the Dells Subdivision for military base housing to serve the Richard Bong Airforce Base. In addition to platting and subdividing the residential subdivision, the developer constructed a small sanitary sewer treatment plant and collections system. In the 1960's the developer and U.S. Department of Defense transferred ownership of the treatment plant and collection system to the newly incorporated Village.

In late 1960's after a fish kill on the lake caused by multiple failing septic system, the residents of Paddock Lake petitioned the Village Board to install a sanitary sewer collection system that would serve the entire incorporated area of Paddock Lake- this collection system is the basis of the system that serves the current Village.

What is a Sanitary Sewer? Sanitary sewers, or wastewater pipelines, transport wastewater from homes and businesses to a centralized treatment plant. Along the way, some extraneous water may enter pipelines either from stormwater or groundwater, a problem commonly known as infiltration and inflow or (I & I). Once wastewater reaches the plant, it is treated and returned to the environment. Wastewater conveyance and treatment are important because they help to prevent waterborne illnesses and promote general sanitation.

Sanitary sewers differ from storm sewers, which collect snowmelt and rainwater from sidewalks, yards and roadways, and route it to nearby surface water. Although, stormwater is generally not treated, some systems in U.S. municipalities consist of a combined sewer system where both sanitary sewer and stormwater system are combined to transport water waste. The Village of Paddock Lake consists of and operates a separate system, where sanitary sewage and stormwater are separate collection systems.

The sanitary sewer system contains sewer laterals that connect individual buildings to the main sewer pipelines; these laterals are entirely owned, maintained, and managed by the property owner that the lateral serves. Sewer pipelines and the sewer collection mains along with pump stations, force mains, maintenance access holes, storage facilities, and other components that are located in the Village roads that the laterals deposit waste into for conveyance to the treatment plant, these sewer mains and pumping stations are owned maintained and managed by the Sanitary Sewer Utility District- which is officially owned by all of the users of the sanitary sewer system.

Sanitary Sewer Design: Most sewer systems are designed to take advantage of gravity flow. Therefore, their design depends heavily on topography, with sewer lines sloping downward toward a wastewater treatment plant at a lower elevation than the collection system. In areas with flat terrain, pipes are buried on a gradient, starting shallow, and going deeper until excavation becomes uneconomical, then a pump or lift station moves wastewater into a new pipe section at the minimum burial depth. Which in Wisconsin, is typically five feet of ground cover. In areas with limited topographic relief or places where excavation is impossible, wastewater may be conveyed through pressure pipelines.

Sanitary sewer design is also based on projected flow-the amount of wastewater that will move through the system based on population and infiltration. In general, when selecting pipe size, slope and pumping devices the systems are designed for wastewater with small biodegradable solids such as humane waste and toilet paper. The Village sewer system was not designed to convey large solids, plastics, cloth wipes, hygiene products, or grease; these items are referred to as illicit waste and should be kept out of the wastewater system.

Sanitary Sewer Overflows: A properly designed and maintained sanitary sewer system is meant to collect and convey all the wastewater that flows into it to a treatment plant. Overflows can occur from blockages and clogs within the sewer pipelines caused by debris being deposited in the system, tree roots, and food waste grease. In recent years the Village has experienced an increase in these overflows directly attributed to users flushing illicit waste into the collections system, these illicit items include cloth wipes, food waste and plastic items that cause blockages.

What is Illicit Sewer Waste:

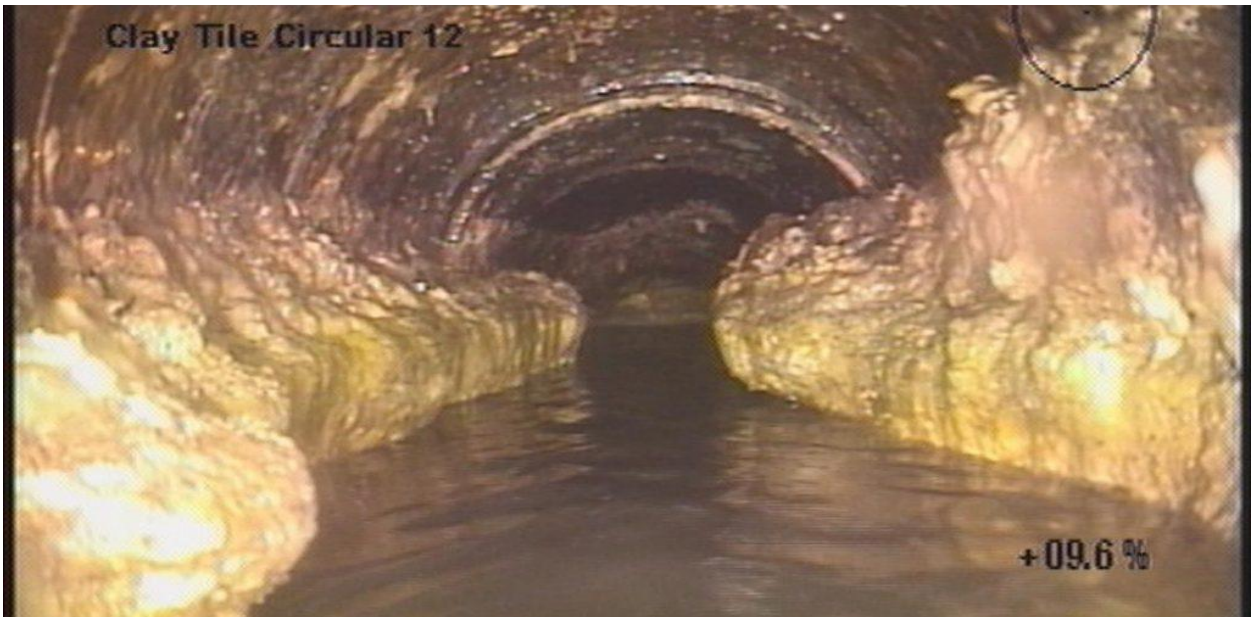
Flushable Wipes and Cloth

Flushable Wipes are the biggest culprit in clogging sewage systems. Paper towels consistently make up the largest portion of debris found on wastewater system filter screens, accounting for almost 50%. This is not surprising, considering that 44% of people who flush non-flushable items admit to flushing paper towels.

After paper towels, the biggest non-flushable offenders are baby wipes, then feminine hygiene products and finally, household, and personal care wipes.

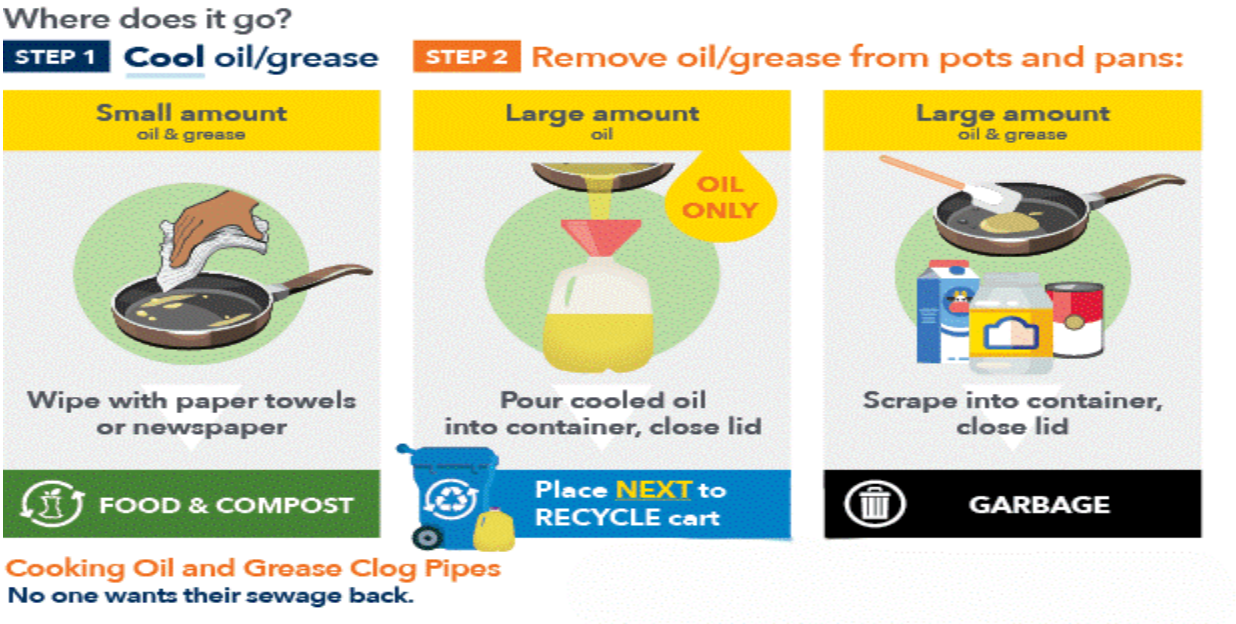
Fats Oils and Grease (FOG)

Residual fats, used cooking oils and grease (FOG), are byproducts of food preparation that must be responsibly managed to avoid these troublesome materials from entering the sanitary sewer system. When FOG is allowed to go down the drains and into the sewer collection system, it solidifies, reducing and preventing water flow in drains and sewer pipes. These wastes collect and attach to the sides of the collection system pipes and obstruct sewer flows that result in Sanitary Sewer Overflow's (SSO's) that can potentially result in raw sewage spilling out of the collection system and backing up into basements.



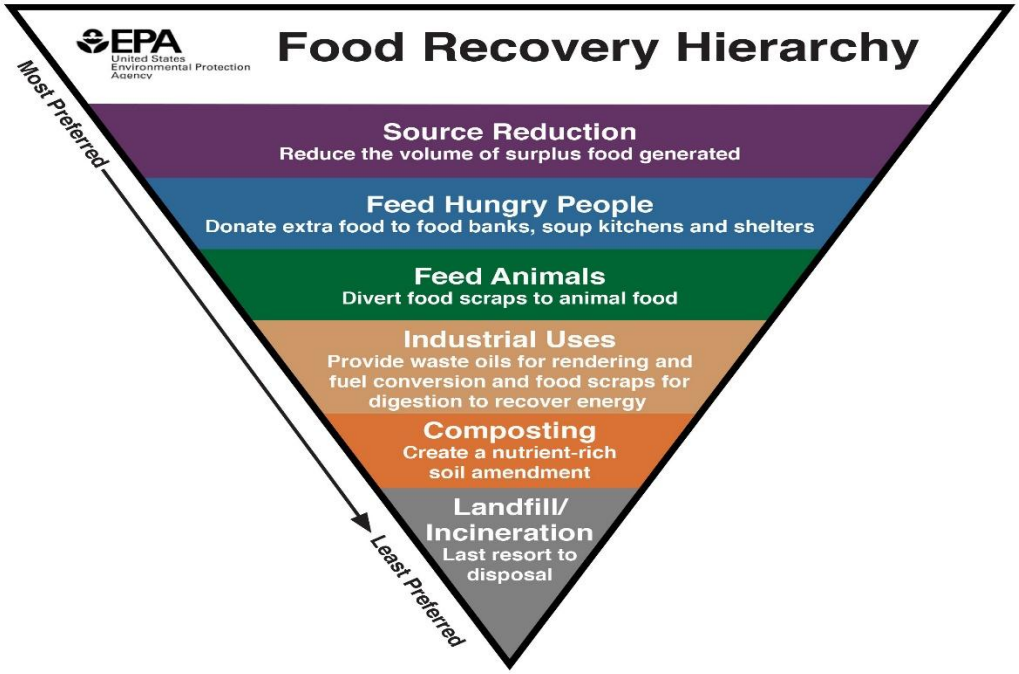
Best Practices for Managing FOGs are:

- Remove food waste materials by methods such as scraping or wiping before using water for washing of pans, dishes, and utensils will capture FOG containing residues before they go down the drain.
- Never pour liquid grease, oils or fats down the drain or flush down the toilet.
- Place fats, oils, and grease (FOG) in the trash for disposal.



Food Waste

Placing food waste into drains has the potential to clog sewer laterals and sewer collection system mains. In addition to creating blockages, excess food waste in the sanitary sewer collection system creates negative environmental impact, such as the buildup of hydrogen sulfide and the emission of methane gas. The production of sulfide and methane has been widely considered as a major concern in sanitary sewer management. Sulfide in sewers, produced by sulfate-reducing bacteria in biofilms, can attach to pipe walls causing detrimental effects such as concrete corrosion and corrosion of cast iron laterals. In addition to corrosion on pipes and infrastructure, food waste in the sewer plant promotes a thick and dense sewer biofilm with a heterogeneous structure also known as a sludge blanket in the plant, thus limiting oxygen diffusion in the wastewater.



Hygiene Products

Personal Hygiene products include cotton swabs, dental floss, makeup removal wipes, baby wipes, toilet wipes, tampons, and feminine pads. These products are durable and dense for a reason; they do not break down quickly or easily and should never be flushed. These products may seem harmless, but they are very problematic inside the sewer system, causing clogs and blockages.

Prescription Medications

The sanitary sewer plant functions and operates with the use of microorganisms (Sewer bugs). These microbes work to consume by eating organic matter within the wastewater- they are the backbone of the treatment process. Sewer plant microbes are under constant barrage and attack from prescription medications that are introduced to the sewer plant by flushing medications down drains and toilets.

Thankfully, there's an easy way to safely and properly dispose of your unused medications without flushing. The Deterra Drug Deactivation system is now available for residents free of charge, the deactivation pouch is available for pickup at the Village Hall Monday through Friday from 8:00 am to 4:30 pm. Deterra is a plant based pouch that contains activated charcoal and works by bonding to pharmaceutical compounds of the prescription drugs: simply place unwanted medications into the charcoal pouch, add water, seal pouch, shake bag and dispose of the pouch in trash.

Chemical Cleaners and Drain Cleaners

When a drain clog strikes, the promise of a "quick fix" from a bottle of chemical drain cleaner can be incredibly tempting. A simple pour, a short wait, and the problem seems to disappear. However, this seemingly easy solution is far from harmless, and what many homeowners don't realize is that these harsh corrosive chemicals can and do cause significant long-term damage to the insides of privately owned sewer laterals, that are typically cast-iron, and lead to expensive problems down the road.

As an alternative, residents should consider opting for biodegradable natural solutions that not only safeguard your plumbing system but also reduces negative impacts to the environment.

Eco-friendly options, like enzyme-based drain cleaners, offer a powerful and safe way to manage clogs without harming pipes, pumps, and the environment.

Laundry and Dishwashing Detergents

Laundry and dishwashing detergents containing above average quantities of phosphates can upset the balance of the Village treatment system. Instead, residents should opt for biodegradable and phosphate free detergents whenever possible.

Water softener Salt (Chloride)

The Village sanitary sewer system operates under a US EPA and WI DNR chloride reduction variance. This variance permits the Village to operate the existing aeration activated sludge treatment plant without the need for a very expensive chloride filter system, provided the Village and its sewer system users meet minimum chloride reduction measures. The (2026-2031) variance terms require that chloride (salt) reaching the sewer treatment plant be reduced by 35%, if the established chloride reductions are not obtained, the US EPA and WI DNR are likely to require the construction and operation of a very expensive filtration system that could equate to a sewer user rate increase of $85.00 per quarter or $340.00 per year.

How does salt make its way into the sanitary sewer system?

Water softeners release salt-laden brine during backwash and regeneration cycles; this brine contains high concentrations of chlorides. This heavily concentrated chloride brine places an undue burden on treatment plant microbes, causing a corrosive condition that rapidly destroys pumps and cast-iron laterals, passing through the treatment plant untreated and into the environment.

What can be done to reduce the quantity of salt (chloride) entering the sanitary sewer system?

A properly functioning and optimized water softener can reduce the discharge of brine chloride by as much 25%. If all existing water softeners in the Village were functioning properly, the Village treatment plant could realize a 45% reduction in chloride entering the sewer system.

The Village Sanitary Sewer Utility District offers a funded program where sewer-users can take advantage of this optimization program. The optimization program reimburses sewer-users up to $150.00 for expenses related to having a qualified water treatment contractor or plumber to tune-up or optimize old inefficient water softeners.

Illicit Material Source Reduction Education Program

For a sanitary sewer customer to be eligible for the Utility District user-charge credit reduction, the applicant must meet the following criteria:

1. The applicant must be an existing user of the Paddock Lake sanitary sewer system.
2. The sewer user must complete the sanitary sewer system education program; complete the program answer sheet and obtain a minimum score of 70%.
3. Applicants must agree to continuously perform the sanitary sewer best management practices taught in the sewer system education program.
4. Sewer-users must be current with all fees owed to the Village. Users owing fees, fines, taxes, or unpaid special assessments to the Village are not eligible to participate in the user-charge credit reduction program until all delinquent fees are paid in full.
5. Only one user credit per household per calendar year.

Education Course Verification Form and Question Answer Sheets

Applicants Name_____ Date_____

Address_____ Utility Account No._____

Telephone Number_____ Email Address_____

1. What type of sanitary sewer treatment plant does the Village operate?
   a. Southern hemisphere system
   b. Let us hope it works system.
   c. Aeration activated sludge system.
   d. Northern hemisphere system
2. The Village sanitary sewer collection system was designed and constructed to convey large solids, plastic, cloth wipes, hygiene products, and grease.
   a. True
   b. False
3. What are the results of sanitary sewer blockages?
   a. Inconvenience to sewer users.
   b. Damage of system components.
   c. Sanitary sewer overflows.
   d. All the above.
4. Who owns the Village of Paddock Lake sanitary sewer collection and treatment system?
   a. State of Wisconsin.
   b. Commercial users of the system.
   c. Residential users of the system.
   d. Both B and C
5. The acronym FOG represents Fats, Obstructions and Grease.
   a. True
   b. False
6. Sanitary sewer collection systems are designed to take advantage of _____.
   a. Frost depth
   b. Proximity to streets.
   c. Gravity
   d. Soil conditions.
7. What is the age of the Village sanitary sewer system?
   a. 1940's
   b. 1990's
   c. 1950's
   d. 1960's

8. How many miles of pressurized sewer lines exist in the collection system?
    a. 16.33 miles
    b. 43.1 miles
    c. 1.6 miles
    d. 1.1 miles
9. Drainpipes connecting homes and businesses to the Village collection system are known as?
    a. Conduits
    b. Turd tubes
    c. Private laterals
    d. Septic pipes
10. The Village sanitary sewer collection system is a combined sanitary sewer and stormwater system?
    a. True
    b. False
11. The largest culprit for clogging sewer systems is.
    a. Wash clothes
    b. Baby wipes
    c. Paper towels
    d. Newspapers
12. The proper method for disposing of food waste oils and grease are.
    a. Have pets lick the pots and pans.
    b. Pour cooled oils into container and dispose in trash.
    c. Wipe pans with paper towels and dispose in trash.
    d. Both B and C
13. Sewer system microbes are the backbone of the treatment process. Sewer plant microbes are under constant barrage and attach by which of the following?
    a. System alligators
    b. Goldfish
    c. Flushed prescription drugs.
    d. Both A and B
14. When finished with personal hygiene products the product should be disposed of in which of the following methods?
    a. Toilet
    b. Compost pile
    c. Trash can
    d. None of the above
15. Food waste oils and grease are allowed to be flushed down toilets and drains if followed by hot water.
    a. True
    b. False

16. What government agency administers overseas, and licenses the Village Wastewater treatment system?
    a. Kenosha County Department of Health
    b. U.S. Homeland security
    c. Wisconsin Department of Natural Resources
    d. Wisconsin Department of Trade
17. Placing food waste into drains has the potential to create which of the following negative impacts.
    a. Buildup of hydrogen, sulfide, and methane gas.
    b. Create system blockages.
    c. Increase sewer system sludge.
    d. All the above
18. Illicit materials being deposited into the sanitary sewer system increased in 2010.
    a. True
    b. False
19. The original sanitary sewer system was built for which of the following government agencies.
    a. State of Wisconsin
    b. Village of Paddock Lake
    c. U.S. Department of Defense.
    d. U.S. EPA
20. When fats oils and grease are allowed to go down drains and sewer pipes, these wastes collect and _____.
    a. Solidify and float.
    b. They are eaten by alligators in the system.
    c. Attach to the sides of collection system pipes.
    d. Attach to tops of pipes.
21. Sludge in the treatment plant is also known as.
    a. Floating food waste
    b. Mixed liquor
    c. Biofilm with heterogeneous structure
    d. Submerged blanket
22. Eco friendly options, like _____drain cleaners, offer a powerful and safe way to manage clogs without harming pipes, pumps, and the environment.
    a. Distilled spirits
    b. Enzyme-based
    c. Plungers
    d. Liquid infused ferry dust
23. Prescription medications flushed down toilets and drains can cause sewer microbe's stress.
    a. True
    b. False

24. The U.S. EPA chloride variance terms require a reduction of_____.
    a. 695,000 pounds of chloride.
    b. 35% reduction
    c. 52 mg/L per day
    d. 45% reduction.
25. Hygiene products are durable and dense for a reason and with time will break down in slow moving drains.
    a. Ture
    b. False
26. The Village Sewer Utility District offers funding to sewer users for participating in the water softener optimization program.
    a. True
    b. False
27. What are the average annual costs the Utility District experiences to remove illicit debris from the collection and treatment system?
    a. $136,000
    b. $225,000
    c. $92,300
    d. $109,000
28. How many collection system pumping stations are in use within the sanitary sewer collection system?
    a. 10
    b. 6
    c. 4
    d. 5
29. How many total sewer users are there using the sewer system?
    a. 1,339
    b. 2,210
    c. 1,482
    d. 1,894
30. Grease and oils once in the collection system solidify and float harmlessly to the treatment plant.
    a. True
    b. False

Detach the answer sheet portion of the quiz and return the answer sheets to the Village Utility Clerk for scoring and credit. Please retain the remainder of the education program for household use.

To be completed by Village staff

Answer sheet scored by_____Score _____

Applicant up to date on fees owed to Village_____ Credit applied to Account_____