



Grease Is The Word

When planning for a new Synagogue to be built, the Baltimore County Health Department knew they had to require more than conventional treatment to manage the fats, oils and grease that would be generated by the social hall. High strength waste surging out of the grease trap during busy times could cause plumbing blockages and complete system failure. Previous experience had taught them to prevent the problem before it occurred, rather than repair it afterwards. The temple's 500 families now rely on a method of advanced pretreatment that serves as faithfully as they do.

Background Information

The City of Owings Mills is located fourteen miles from the city of Baltimore. It is home to the Har Sinai congregation. Har Sinai is the oldest Reform Jewish congregation in the United States. During its early days, the congregation met regularly at the homes of various members. After several years of humble gatherings, their first temple was erected in 1849. Over the course of a century, the group called several small temples home. In 2000, they were able to begin building a new temple which included a school, social hall, and kitchen to prepare food for gatherings. Due to its location outside the reaches of municipal sewer, the new structure



"For restaurants, facilities with food preparation, and other producers of high organic wastewaters, the designers must evaluate alternative pretreatment schemes that can reduce the excess organics..."
(USEPA Onsite Wastewater Treatment Systems Manual)

needed to use an onsite treatment and disposal system.

The new grounds included enough room for a large, multi-tank septic system and leaching tile field. The major issue would be the disposal of food and grease from that beautiful new kitchen area. Fats, oils and grease, not properly treated, will create significant problems in an onsite system. Hydraulic surges from dishwashers and appliances push grease downstream and keep it in suspension. If the grease reaches the disposal bed, the piping and soil within the bed will become clogged. Based on their own experience, and national research showing the increased failure rate associated with grease disposal in onsite systems, Baltimore County required additional treatment to protect the Har Sinai congregation.

Regulatory Requirements

Baltimore County and regulatory agencies across the country have adopted guidelines to address the removal of fats, oils and grease. Baltimore County's guidelines now include the use of a commercial grease trap filter for all food service facilities utilizing an onsite treatment system. Problems occur with the high strength waste when the grease is liquefied by warmer temperatures or commercial detergents used for sanitation. The liquefied grease is usually pushed out of the facility by hydraulic surges. Later, the grease solidifies

in sewer collection lines or enters the pores of the soil-based receiving environment.

No matter which type of final treatment is used, municipal or onsite, most agencies require only a small in-kitchen grease interceptor or conventional in-ground grease trap. Grease interceptors are small and fill quickly. Therefore, they require cleaning more frequently than conventional grease traps. Grease interceptor cleaning is a messy job accompanied by foul odors. Once full, flow continues past the interceptor carrying out everything that goes into the system.

Conventional grease traps are intended to hold the flow for a minimum of twenty-four hours to insure grease retention. Often the tank volume does not account for peak flow periods that are common in food service applications. The problems occur when traps are not cleaned regularly and surge flows allow the warmer incoming liquid to resuspend the grease already in the trap. A University of Wisconsin study found that grease traps are only capable of removing up to 60% of the fats, oils and grease typically found in restaurant waste.

Regulatory agencies are increasingly holding treatment system owners and operators responsible for water pollution stemming from grease related problems. The USEPA has filed numerous lawsuits over the past decade for sewage spills related to grease blockages. The City of Baltimore agreed to a \$600,000 civil penalty for hundreds of unpermitted sewage discharges, with one of the primary causes being grease blockages. The settlement also included \$940 million worth of treatment system and sewer line renovations over fourteen years. The City of Los Angeles was sued for allowing over 2,000 sewage overflows in a five year period. Approximately 41% of those spills were blamed on excess grease

build-up in collection system piping. The California EPA can also fine the city up to \$3,000 per violation. New York city's sewer system is operated by the Department of Environmental Protection. They have enacted stringent legislation to fine food establishments as much as \$1,000 per day for violations of their fat and grease discharge requirements.

Why Municipalities Struggle

Municipalities spend millions of dollars on an annual basis for sewer repairs and upgrades. Grease can create large scale problems for municipal collection and treatment systems. As grease hardens, it clings to the inside of sewer collection lines. As layer upon layer hardens, the pipe eventually becomes completely blocked. These blockages can create problems for an entire community. A blocked sewer line causes sewage to back up into homes or businesses and

may even cause manholes to overflow, creating a public health hazard.

USEPA statistics show that nearly 75% of our nation's municipal sewers are only working at half capacity due to grease related build-up. Baltimore County, Maryland reports that roots, debris and grease build-ups are the most frequent causes of pipeline blockages and overflows, accounting for 71% of manhole overflows.

Problems for Onsite Treatment Systems

Regulators agree that grease does not belong in an onsite system. Agencies recommend that homeowners avoid disposing of the small amounts of grease created by a single residence in their onsite treatment system. Wastewater strength from restaurants or food service can be up to twenty times stronger than that produced by a single family residence, so it is imperative that grease is prevented from reaching the onsite

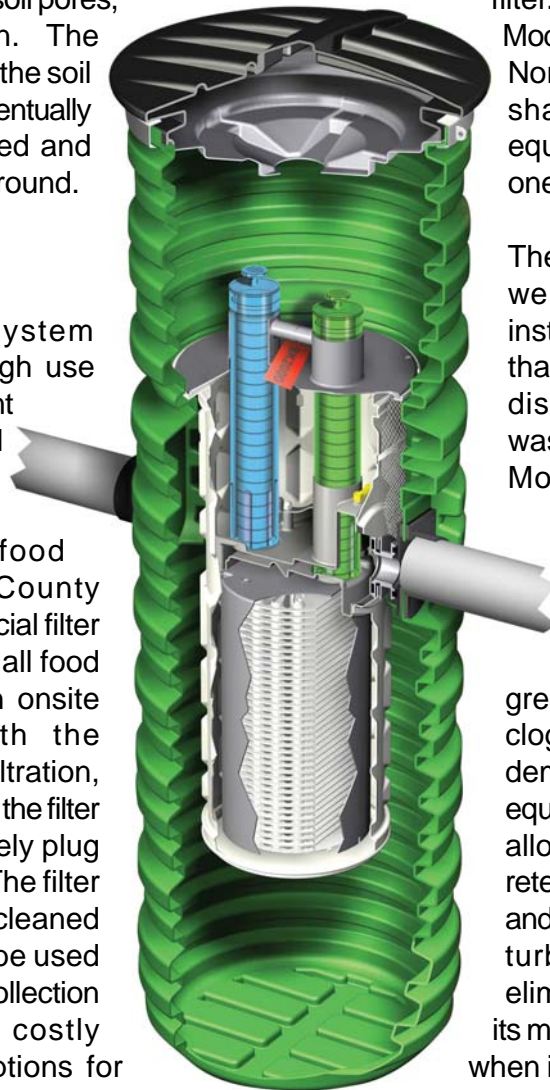
“Roots, debris and grease build-ups are the most frequent causes of pipeline blockages and overflows, accounting for 71% of manhole overflows.”

treatment or disposal system. Hydraulic surges produced by periods of peak usage can force liquefied grease through the grease trap and treatment system. When grease reaches disposal system piping it will quickly cool and solidify as it disperses. As the grease reaches the soil absorption system it can clog soil pores, preventing water absorption. The ultimate result is the failure of the soil absorption system. Effluent eventually seeps out of the disposal bed and ponds on the surface of the ground.

Preventative Pretreatment

If an onsite treatment system following a restaurant or high use kitchen is to provide permanent treatment, it must be designed to accommodate the higher waste strengths and hydraulic surges associated with food preparation. Baltimore County requires the use of a commercial filter following the grease trap for all food service facilities utilizing an onsite treatment system. With the requirement of commercial filtration, the system is self-regulating. If the filter is not serviced, it will ultimately plug and no longer pass liquids. The filter media will then need to be cleaned before the kitchen area can be used again. It prevents the entire collection or disposal system from costly renovations or repairs. Options for corrective action are typically limited and very expensive. In most cases, drain field renovation costs compare directly to the estimated \$15,000 price tag of a new onsite system.

Harms & Associates, Inc., a civil engineering company in Pasadena, Maryland was chosen to head the project. The engineers designing the system were familiar with the additional filtration and pretreatment requirements following food service facilities. A grease interceptor or grease trap wouldn't be enough to handle the job, because the system would be subject to surge flows during social events. The engineers worked closely with

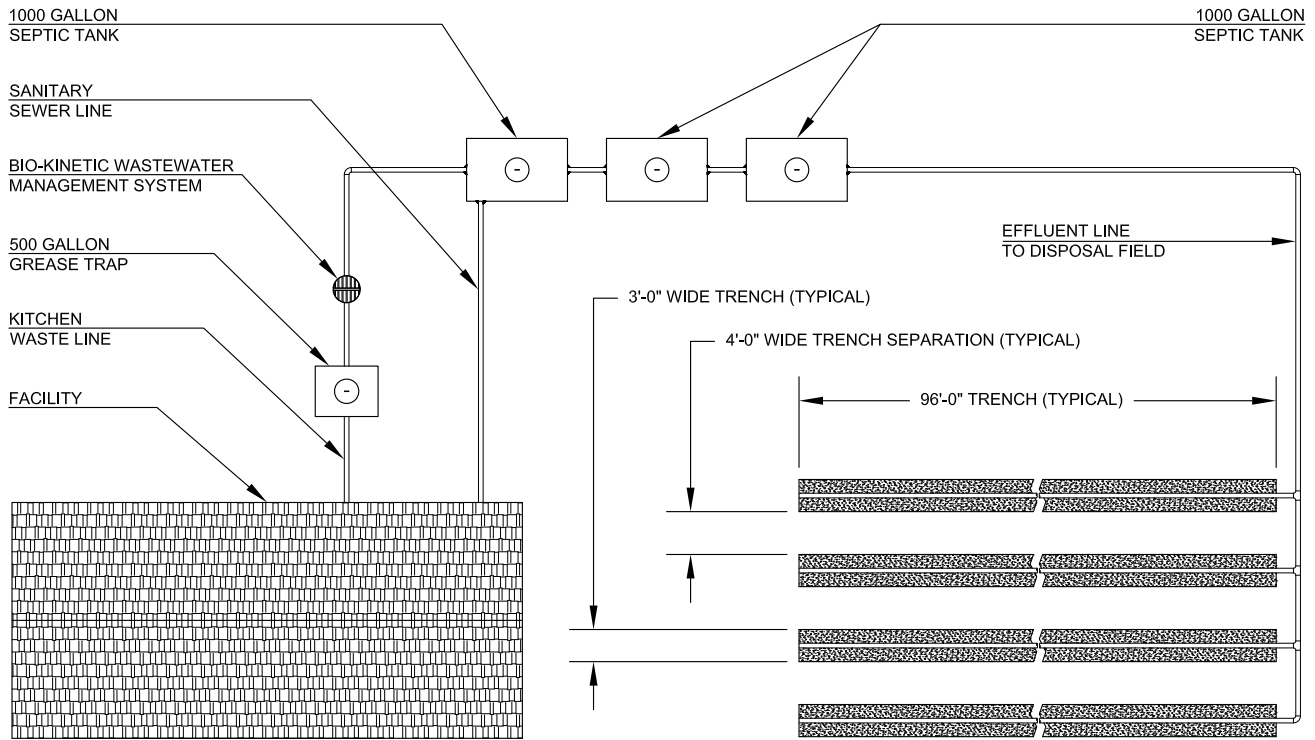


Baltimore County officials to make sure the system met all regulatory requirements and would provide reliable long-term treatment. Harms & Associates, Inc. specified that "immediately following the outlet of the grease trap, shall be installed one Baltimore County approved commercial sewage effluent filter. The filter shall be a Bio-Kinetic Model BK 2000, as manufactured by Norweco, Norwalk, Ohio. The filter shall provide filtration, settling, equalization and solids retention in one compact unit."

The Har Sinai temple's problems were solved at an approximate installed cost of \$1,500. To insure that grease would not reach the disposal system, a Bio-Kinetic wastewater management system, Model BK 2000, was installed following the grease trap, upstream of the septic tanks. The BK 2000 makes grease traps work better because it equalizes the flow and filters grease before field lines become clogged. The BK 2000 provides demand use, non-mechanical flow equalization through the grease trap, allowing the trap to achieve design retention time to collect more grease and organics. With flow equalization, turbulence within the trap was eliminated. Flow equalization is at its maximum at the exact point in time when it is needed most, when the flow rate is at its highest. That is what is meant by demand use flow equalization.

The settling and retention areas of the BK 2000 allow the fats, oils, grease and solids to be trapped for removal during routine service. If the BK 2000 is not serviced regularly, the kitchen area will begin experiencing sluggish drains. Even with a complete lack of service, flow could not bypass the filter. Flow would eventually back-up to the grease trap and grease would not escape to the treatment or disposal system. Some alternative design options include the use of an additional BK 2000 following the septic tank.

SYSTEM INSTALLATION



Prevention Insures Long-Term Success

The adoption of additional measures to prevent grease from reaching municipal collection or onsite treatment and disposal systems must be evaluated to meet local regulatory needs. The Baltimore County Health Department and Harms & Associates recognized that prevention is always the best policy to insure long-term success. The solution to Har Sinai's problem supports the directive of the USEPA which stated "For restaurants, facilities with food preparation, and other producers of high organic wastewaters, the

designers must evaluate alternative pretreatment schemes that can reduce the excess organics." The development of advanced onsite treatment technologies, such as the Bio-Kinetic wastewater management system, provides regulators, engineers and citizens options for dealing with environmental challenges.

For additional information on the BK 2000 or Norweco's full line of advanced onsite treatment technologies please call: (419) 668-4471, send a fax: (419) 663-5440, email: email@norweco.com or visit us on the web at www.norweco.com.

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