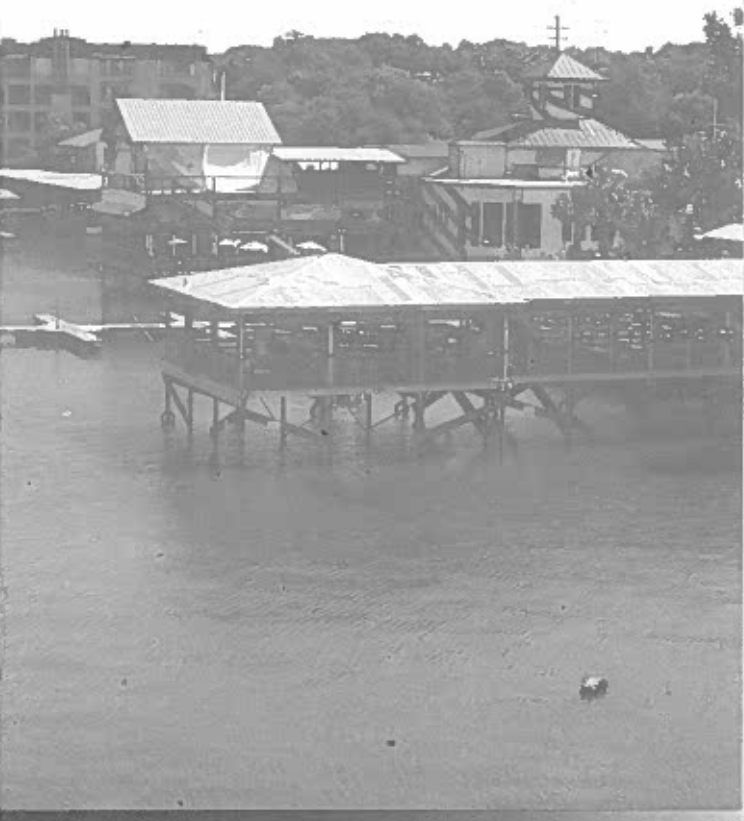
WATER RESOURCE PROTECTION

COMMERCIAL OSSF CARE



LCRA
ENERGY • WATER • COMMUNITY SERVICES

LOWER COLORADO RIVER AUTHORITY

COMMERCIAL OSSF CARE

Since September 1971, LCRA has regulated the installation and operation of on-site sewage facilities (OSSF) within a 2,200 foot zone around the Upper Highland Lakes and a 2,000 foot zone around Lake Travis. The LCRA OSSF Program also serves within the corporate limits of Lakeway, Lago Vista, Granite Shoals, Briarcliff, Jonestown and Volente.

The number of people choosing to live and work around the Highland Lakes is increasing rapidly. As populations increase, so does the number of businesses that use OSSFs. Many of these businesses generate "high strength" wastewaters. These wastewaters warrant additional attention from the standpoint of treatment and disposal and operation and maintenance. Important operational information and suggestions for commercial businesses served by OSSFs are presented in this booklet as a customer service of LCRA.

An on-site sewage facility (OSSF) is designed to treat and dispose of wastewater at the same location where it is generated. Most OSSFs are designed to handle residential or other wastewater generated by typical, domestic human activity. Sometimes OSSFs are required for commercial establishments where the business creates a large wastewater flow or high wastewater strength. These characteristics of wastewater are often the cause of a failing OSSF.

Commercial OSSFs tend to fail more often than those serving single-family residences. Some of the reasons for this include: the designer not obtaining accurate data or taking the business' specific usage into account, or the property owner underestimating the growth of the business. The costs associated with remediation of a failing OSSF can be high.

Possible fines, levied by a judicial court for operating a failing OSSF, also can increase the final costs of an inadequately designed system.

Biochemical oxygen demand (BOD) is a measurement of the ability of wastewater to deplete free oxygen. The anticipated strength of residential wastewater leaving a septic tank is 140 milligrams per liter (mg/L) BOD. This is based on a five-day test (BOD5). The Texas Commission on Environmental Quality (TCEQ) prohibits commercial OSSFs from disposing of wastewater exceeding 140 mg/L BOD5. As a result, many commercial OSSFs must pretreat their wastewater to reduce the BOD to 140 mg/L or less, prior to disposal. Wastewater disposal by spray or drip irrigation requires even further reduction of the BOD.

Particulate loading also should be considered when designing commercial OSSFs. Particulate loading is measured in milligrams per liter of total suspended solids (TSS). In the treatment process TSS can increase BOD as well as reduce natural organic decomposition. Wastewater strength is increased when organic particulates are broken down by microbes in the wastewater, depleting free oxygen. High TSS loading can increase solids accumulation in the tank, thereby reducing retention time and treatment. TSS that enters the disposal area may clog soil pores reducing absorption capabilities.

A study of restaurant wastewater strength, funded by the Texas On-site Wastewater Research Council, was performed in 2002. Results from that study indicated that restaurant wastes are generally much higher in BOD, TSS and flow volume than residential wastes.

Although food preparation was a factor for the high numbers in this study, there are many other causes that can be found in various types of commercial establishments. Office buildings, which generally generate small flows from a seemingly domestic

source, may have a surprisingly high strength and particulate loading. This is usually due to the lack of greywater generating activities, such as laundry washing, which typically have low BOD and TSS and lower the overall wastewater strength.

Similar problems can be found in recreational vehicle parks. RV owners commonly practice water conservation because they sometimes depend on limited sized holding tanks to store potable water and wastewater for extended periods. RVs, in turn, are designed to use small amounts of water for day-to-day functions. When RV waste holding tanks are emptied into an OSSF or an RV park uses an OSSF to provide wastewater services for guests, the concentrated wastes may significantly increase BOD and TSS. Waste concentrations can be diluted by providing separate showers or laundry facilities for guests. These amenities should be included in the OSSF design.

RV operators typically use deodorants within their waste holding tanks that retard or mask odors from normal decomposition. These chemicals also can affect treatment within the OSSF. If the designer cannot properly accommodate for the use of these products, it is recommended that a holding tank be included in the design proposal to accept wastes from incoming RV park guests. The holding tank can be pumped by a licensed waste hauler, when necessary, to prevent unwanted chemicals from entering the OSSF.

Doctor and dentist offices, as well as nursing homes, also may present problems to an OSSF. Disposal of expired pharmaceuticals into an OSSF as well as the high content of

antibiotics in the normal wastes of clients can disrupt the biological balance within the treatment system. These establishments also use a large amount of cleansers and disinfectants to maintain a sterile environment. These chemicals also can disrupt the biological processes within the OSSF, if improperly disposed.

Many times employees or customers, unaware of the delicate nature of the OSSF, may abuse the system by dumping wastes or chemicals down the drain or commode that should be disposed of in another manner. Another common problem originates from water left running for extended periods of time causing hydraulic overload of the OSSF. This "flush and forget" operation can negatively affect the treatment process as well as over saturate the disposal area. An oversaturated disposal area can cause problems inside the establishment, such as slow or no drainage in sinks and commodes as well as create a damp, odorous area outside.

When the wastewater volume is high, LCRA may require commercial establishments to install a meter on the OSSF to monitor the actual wastewater flow. The OSSF operator is required to take readings and submit monthly reports to LCRA. If the OSSF is receiving more wastewater than it was designed to treat and dispose, the owner and LCRA can be alerted to the potential problems before they occur. The meter readings also will supply the OSSF operator with historical wastewater flow data. This resource can be used to provide justification for business expansion, without upgrading the OSSF, if the wastewater flow is well below capacity.

Most commercial OSSFs consist of three main components: grease interceptor, treatment and disposal area.

Grease Interceptor: Food preparation usually produces or requires fats, oils or greases (FOG). Too much FOG can be detrimental to an OSSF. TCEQ requires a grease interceptor on all kitchen waste lines from institutions, hotels, restaurants,

schools with lunchrooms and other places that may discharge large amounts of greases and oils.

A grease interceptor is a tank designed to allow the FOG to separate from the rest of the wastewater. The grease interceptor holds the separated FOG until it is pumped by a licensed waste transporter. It is recommended that an agreement with a local pump company be established to service the grease interceptor on a routine basis. The pumping frequency can be determined by monitoring the accumulation of FOG within the tank. The frequency required for pumping the tank can be reduced by alternate means of FOG collection and disposal outside of the OSSF.

Grease skimmers are commonly used to reduce the amount of FOG that reaches the OSSF. Skimmers and other grease recovery devices often are located within the kitchen where they are easily accessed.

Treatment: Due to the high BOD and TSS associated with most commercial wastes, commercial OSSFs often require a higher degree of treatment than standard septic tanks provide. The higher the BOD and TSS the more treatment required to produce an acceptable effluent for on-site disposal. This increased treatment is commonly provided by aerobic treatment units or specialized filtration units. While these treatment methods provide a cleaner effluent, the additional mechanical and electrical parts create more opportunity for malfunction. Many times the treatment process is a delicate biological balance which can be upset by improper waste disposal.

Most OSSFs using these advanced treatment methods are required to have an operation and maintenance (O&M) contract with a certified company. The maintenance contractor is charged with routine visits to the OSSF to ensure it is operating properly. O&M reports from each visit must be provided to both the owner and the OSSF regulatory authority.

When electrical components are used to facilitate treatment and disposal they must be equipped

with audio-visual alarms to notify the owner or maintenance company of a malfunction. These alarms should be located so they can be seen easily and heard when activated during business hours. Also it is recommended that a responsible individual check the alarms on a daily basis.

If the treatment process is not designed adequately for the wastewater strength, improperly treated waste will enter the disposal area resulting in premature blockage of the soils and over saturation. If spray irrigation is the disposal method, this will result in the surface discharge of improperly treated effluent where it can come into direct contact with pets or children. FOG also can raise the BOD of wastewater or interfere with the treatment process. This is another reason to ensure the grease interceptor is serviced in a timely manner.

The amount of water used within a business will affect the treatment process as well. Treatment systems are designed on the anticipated wastewater flow as well as wastewater strength. If too much water is sent to the OSSF, it will decrease the retention time within the treatment system, resulting in poor effluent quality. Some treatment systems also may suffer from too low of a wastewater flow. High and low flows can cause problems down the line in the disposal area.

Solids accumulation in the treatment system must be monitored also. Depending on the type of business and waste removal practices inside the establishment, the treatment tanks may require routine servicing. This includes pumping solids from tanks or replacing filter media. If an O&M contract is already in place, the maintenance provider should alert the OSSF operators when these actions are required.

Disposal Area: The final destination of the wastewater, within the OSSF, is the disposal area. The disposal area may consist of an underground absorption or evapotranspiration system, or surface application system.

Absorptive disposal systems are based on soil depth, soil classification, topography, depth of the groundwater table and available surface area. Absorption systems allow the effluent to disperse through a series of underground trenches where it absorbs into the native soils or is used by plants for a nutrient-rich food and water source. Soil absorption provides further treatment and filtration of the wastewater through the natural pores in the soil. Plants that assimilate the wastewater into their roots will break down the remaining organic material for food and release the water through transpiration from leaves.

Evapotranspiration (ET) systems are designed to allow wastewater disposal by soil evaporation and plant transpiration only. Typically, these are used only when soil and site conditions are unfavorable or there is a water well too close for other types of disposal systems. Water conservation is very important when operating an ET system because they are extremely susceptible to hydraulic overloading.

Surface application or spray irrigation systems use sprinklers to distribute properly treated and disinfected wastewater directly on a vegetated surface. LCRA requires that irrigation occur during nighttime hours to lower exposure risks to people or pets. Wastewater not taken up by plants or absorbed by the ground will evaporate with the rising of the sun. Spray irrigation systems require a larger area than other disposal methods to avoid ponding or pooling of wastewater from over saturation.

If too much water enters an OSSF, the disposal area will become oversaturated. The soil and vegetation will not be able to absorb the effluent quickly enough. This can result in a wet, swampy area near the establishment. The area may have a

strong, foul odor due to the improperly treated effluent pooling and ponding on the surface. ***This is a public health hazard and can result in enforcement action by LCRA.***

If the wastewater flow overloads the treatment system, the organic material may not be adequately decomposed or non-biodegradable matter may enter the disposal area and cause the soil pores to clog. This will limit the ability of the soil to absorb the wastewater, which can result in a health hazard, and slow or stop drainage within the establishment's plumbing fixtures.

Summary: With proper management and maintenance, an OSSF can provide many years of low-cost and environmentally friendly waste treatment and disposal. A properly working disposal area should appear, on the surface, to be a well maintained and functional lawn providing visual aesthetics for customers. The grease interceptor and treatment system are normally located below ground. Above ground service ports or electrical and mechanical parts can be shielded from view and protected from damage with landscaping that blends in with the surrounding environment. An OSSF also may reduce the need to irrigate with fresh water.

Over time, average market rates for servicing the grease interceptor, holding tanks, treatment tanks, and possible operation and maintenance contracts may increase. These costs on average, with a properly designed and maintained OSSF, may be less than a monthly sewer service fee.

Many businesses have bad relationships with their OSSF. Unfortunately, this is often due to an uneducated staff or clientele. A "flush and forget" attitude is too often the culprit of many OSSF failures. Non-biodegradable items are frequently flushed down commodes, chemicals such as cleaners are disposed of down the drain or large quantities of food are discarded through the garbage disposal. All of these can have a negative effect on an OSSF. Employees should be kept educated and updated on acceptable and

unacceptable practices. It is also imperative that all water fixtures are kept in good repair and not allowed to leak or run continuously.

For a commercial OSSF to function properly, it must be specifically designed for each establishment. Depending on the type of business, the grease interceptor, treatment system and disposal area must be capable of handling the expected wastewater load as well as occasional, increased "peak" loadings.

OSSF designs should also take into account low water usage. Small wastewater flows may result in high BOD and TSS due to their concentrated nature. This includes office buildings, banks and warehouses that have a large staff but no kitchen or laundry facilities. RV parks also may have concentrated wastewater due to water conservation generally practiced by the occupants.

Intermittent or seasonal businesses also should be considered when determining the appropriate OSSF. Many types of aerobic treatment units require continuous "feeding" to prevent the starvation of necessary microbes.

Initially, the owner of a commercial OSSF should always discuss with the designer the capabilities the system will have. The designer should, in turn, discuss the limits of the OSSF with the owner who can then pass this information on to employees and customers.

An OSSF may not only be a necessary means of sewage treatment and disposal, it also can be both environmentally and economically beneficial to a commercial establishment.

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RESTAURANT OWNERS:

10 SIMPLE WAYS

TO PROTECT YOUR SEPTIC SYSTEM

Restaurant kitchen wastewater usually contains high levels of food waste and grease. If grease or food solids reach your leaching field, they can permanently damage the field so that it no longer functions to dispose of wastewater. This leads to costly leaching field repairs. You can help protect your leach field by following these simple procedures.

Changing kitchen practices is a low cost but very effective way of protecting your septic system from the effects of grease:

1. Train dishwashing personnel to thoroughly scrape plates and cookware to remove all food waste, especially cooking oils and creamy sauces and gravies which are high in grease, before rinsing dishes. Thorough scraping of dishes will prevent the majority of grease in your waste stream from entering your septic system.

2. Consider installing a grease recovery device (grease skimmer). These devices, installed in the kitchen, are designed to trap and remove floating grease from wastewater before it leaves the building. Wastewater enters the trap where grease rises and is continually skimmed off the water surface. The grease then flows to a collection chamber for recovery. Grease recovery devices can remove a large percentage of grease in wastewater.

3. Practice water conservation. Restaurant kitchens produce surge water flows during

mealtime dishwashing periods. Surge water loads push wastewater through the grease trap too rapidly for grease to separate. Water conservation helps prevent surge loading.

4. Low temperature (sanitizing rinse) dishwashers may assist oil and grease to separate out in the grease trap. High water temperatures cause grease to become emulsified. Emulsified grease does not separate out in a grease trap and may be carried over into your leaching field. Check with your dishwasher manufacturer to see if your machine can be used as a low temperature sanitizing rinse dishwasher.

5. Look for special dishwashing and general cleaning detergents that promote rapid oil/water separation. These detergents are formulated to release oil quickly so that it can rise to the water surface instead of remaining emulsified.

6. Use proper concentrations of solvents, cleaners and disinfectants. Solvents and cleaners can cause grease to become emulsified and be carried past the grease trap to the leach field. Excess use of disinfectants reduces bacterial action in the septic system which in turn reduces treatment of wastewater.

7. Use shortening in place of liquid vegetable oil. Shortenings solidify at room temperature while liquid oils do not. Shortening oils will separate out more rapidly and thoroughly in a grease trap while liquid vegetable oils are more likely to be carried over into the leach field.

Make sure your septic system and grease trap are serviced regularly:

8. Pump grease trap quarterly (unless local regulations require more frequent pumping). Leaving grease in the grease trap too long causes it to harden which makes it very difficult to pump out.

9. Leave most of the liquid in the grease trap when it is pumped. Only the layer of grease

which accumulates on the water surface should be removed when the trap is pumped. Leave the underlying liquid to act as a reservoir of water so that new grease entering the trap can cool rapidly and solidify.

Note: Consider installing a larger grease trap, or a series of grease traps to provide better grease removal. A standard grease trap's volume is intended to provide wastewater with a long enough residence time so that it can cool and grease can separate and solidify. If the grease trap receives high surge volumes of water and/or high temperature water, there may not be enough time for wastewater to cool and grease to separate. A larger grease trap, or a number of smaller grease traps in series, will compensate for this problem by providing a longer residence time.

10. Pump septic tank frequently to prevent buildup and carryover of solids. Because restaurant wastewater contains high levels of solid food waste, sludge may accumulate rapidly. If too much sludge accumulates, solids can be carried over into the leach field and damage it.

Barnstable County (Massachusetts) Department of Health and the Environment - 2003 - Modified

http://www.barnstablecountyhealth.org/AlternativeWebpage/index.htm

ABOUT LCRA

LCRA is a conservation and reclamation district created by the Texas Legislature in 1934. LCRA provides energy, water and community services to the people of Texas. It cannot levy taxes, but funds its operations with income from the sale of electricity, water and other services.

LCRA generates electricity and sells it wholesale to 42 customers, including city-owned utilities and cooperatives that serve more than 1 million people in Texas. LCRA also builds and operates transmission projects through a nonprofit corporation it created, manages and protects the lower Colorado River, provides water and wastewater utilities, owns and operates parks, and offers economic and community development assistance to communities.

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