

## Winery Operations: Best Management Practices (BMPs)

### **BMPs protect the sanitary sewer system and reduce costs.**

The King County Industrial Waste (KCIW) Program works with local industries to make sure their wastewater is properly treated to meet [discharge requirements](#) before entering the [King County sanitary sewer system](#). Wastewater from wineries may contain higher concentrations of organic matter than typical household wastewater. Implementing BMPs helps protect people, the environment, and manage costs.

To help wineries of every size meet their discharge requirements and manage costs, KCIW developed the following BMPs for winery wastewater. The BMPs are categorized by topic area. (Note: Small wineries may be able to meet the requirements without implementing all of the BMPs).

### **Solids management**

Industrial wastewater cannot contain substances that could restrict or block flow in sewer lines. Winery wastewater, including any solids washed down from cleaning, must be capable of passing through a quarter-inch sieve.

The following are BMPs for maintaining compliance with King County's solids limits and prohibitions:

- Install and maintain screens, filters, or baskets on all floor drains and trenches to capture solids.
- Prevent lees, grape pomace, and inorganic wastes (e.g., diatomaceous earth, bentonite clay, and perlite) from entering the sanitary sewer. Collect solids and other materials from all filters, presses, bins, wine and must pumps, and aging containers (barrels, drums, etc.) by settling, straining, screening, or filtering. Also, prevent these materials from entering the sanitary sewer.
- Use the correct gauge screen to maximize solids removal and install screens that are easy to access and service.
- Clean sump screens solids daily and dispose of them properly. Do not dispose of any solids down the sewer.

### **Discharge requirements**

All wineries that send their wastewater to the King County sanitary sewer system must make sure their wastewater meets the following [local discharge limits and prohibitions](#), which are summarized here and also listed in [King County Code 28.84.060](#).

- [Settleable Solids](#): Wastewater must contain less than 7 milliliters per liter of solids capable of settling. Winery wastewater can contain high proportions of solids relative to domestic wastewater.
- [pH](#): The pH of wastewater must remain between 5.0 and 12.0. Wastewater cannot fall between a pH of 5.0 and 5.5 for more than 15 minutes. Wastewater that is too acidic or too alkaline can seriously corrode the sewer system, so the pH must be balanced.
- [Temperature](#): Wastewater must not exceed 65 degrees Celsius (150 degrees Fahrenheit) at the point where it enters the public sewer system or 40° C (104° F) at the treatment plant influent. Winery wastewater that is high in temperature can adversely affect the biological treatment process at King County's smaller treatment plants, such as the City of Carnation and Vashon Island.

- Dewater collected solids and dispose of the solids off-site. When disposing solids off-site, seek opportunities to turn your solids and high-strength waste into compost, fertilizer, animal feed, energy, or another authorized beneficial reuse.
- Collect used filter media (e.g., diatomaceous earth) and dispose of them off-site or consider beneficial reuse.
- Control solids at the source; don't let the solids hit the ground, sweep up and collect spills, and avoid rinsing solids down the drain.
- Train employees on solids management practices.

### **Beneficial reuse**

When disposing solids off-site, consider beneficial reuse. Seek opportunities to turn your solids and high-strength waste into compost, fertilizer, animal feed, energy, or other authorized beneficial reuse.

## **Controlling pH**

In general, winery wastewater is acidic. However, cleaning processes can cause high and low spikes. Therefore, winery operations must maintain compliance with [King County's pH discharge limits](#) to balance the pH of the wastewater being discharged to the sanitary sewer system.

The following are BMPs for maintaining compliance with the County's pH discharge limits (see Figure 2 and Figure 3 for schematics of pH neutralization for single and multiple wastewater batches):

- Install totes, tanks, or containers to adjust the pH of individual waste streams.
- Install a sufficiently sized tank to collect wastewater from all winery operations for the purpose of self-neutralization and, if necessary, to adjust the pH to meet these limits.
- For small batches that may sometimes have a pH above 12 before discharging the wastewater to the sewer, mild acid such as citric acid can be used to neutralize the wastewater.
- For small batches that may have a pH below 5.5 before discharging the wastewater to the sewer, mild alkaline solutions, such as calcium carbonate (lime), can be used to neutralize the wastewater.
- Stronger acidic or alkaline neutralization chemicals may be needed based on the pH of the effluent and the volume of the wastewater to be neutralized.
- Provide a mechanical mixer in the wastewater tank to promote self-neutralizing of low- and high-pH wastewaters. Please note that adequate mixing is essential when using neutralizing chemicals.
- Reuse and recycle chemicals whenever possible through automated approaches (e.g., clean-in-place).
- Train employees on effluent pH management practices.

### **Permitting requirements**

Some businesses need permits or authorization to send their wastewater to the sewer. Wineries must [apply for a discharge authorization](#) if they meet the following criteria:

- Produce 7,500 or more cases of wine per year using a 3-year average, or
- Send 53,305 or more gallons of industrial wastewater to the sewer per year, or
- Are located in the Carnation or Vashon Treatment Plant Collection Zone.

#### **If a permit or discharge authorization is issued, wineries must also install an easily accessible sampling point.**

Samples must be collected that represent the discharge from the winemaking operation in a location that is separate from sanitary drains from tasting rooms and restaurants (see Figure 1). Although small wineries may not always have a separate sampling point, King County reserves the right to require one. Note: In the past, some facilities that grew large enough to need formal authorizations have had to remodel and replace plumbing to meet requirements.

## Pretreatment systems

The following BMPs apply to pretreatment system operations and maintenance:

- If you are required to install a pretreatment system to meet discharge limitations, all equipment must be properly maintained to ensure you meet the discharge limitations.
- Design the pretreatment system to accommodate current and future anticipated discharge rates. Don't exceed the design capacity of the system.
- Train staff so they know how to operate and maintain the pretreatment system and can identify when the system is not functioning properly.
- Regularly assess the upstream processes, pretreatment system, and procedures to ensure that the facility and pretreatment system are operating effectively.

## Product losses/off-spec products

Sending excessive amounts of high strength waste to the sewer can disrupt the sewer system. Also, wineries that send concentrated waste to the sewer system may have to pay extra surcharge fees because it costs more to treat this water than from domestic sources. Therefore, it's important to minimize the volume of unused and off-spec product discharged to the public sewer whenever possible. If there is no other alternative than the sewer, the discharge must meet King County [local discharge limits](#). For non-routine discharges of high strength product, you may be required to contact KCIW to obtain permission to discharge. Special charges may apply to this type of disposal.

In addition to collecting lees, grape pomace, and inorganic wastes, collect the following high strength wastes and dispose of them off-site, considering beneficial reuse for disposal whenever possible:

- Off-spec and unused product
- Tank heels and initial rinse of fermentation bins/tanks
- Wine lost in racking and transfer
- Wine lost in filtering, barreling, and bottling

## Chemical storage and spill prevention

It is important to provide secondary containment for chemical solutions such as cleaning and sterilization chemicals and waste materials to prevent the entry of these materials into the King County sanitary sewer system in case of accidental spills. The following are BMPs for chemical storage and spill prevention:

- Staff should be trained on proper handling and disposal of chemicals.
- Store chemical solutions in low-traffic areas, away from forklifts and other production activities, to lessen the chance of an accidental spill.
- Segregate and securely store noncompatible chemicals (e.g., acids and bases) in separate containment areas to prevent mixing of noncompatible or reactive materials.
- Maintain and inspect all process solution tanks on a regular basis and repair any leaks promptly.
- Label all chemical solution storage containers.
- Develop a spill response plan and train employees to follow the spill plan. Post the spill plan and the contact information for spill notification in a prominent place at your facility. At a minimum, the plan should:
  - Describe where chemicals are stored, how liquids are stored and handled to prevent and isolate spills, and transfer protocols.

- Describe how staff will respond to a spill, including immediate notifications to emergency responders and the King County Wastewater Treatment Division:
  - M-F, 8 a.m. to 5 p.m.: Industrial Waste Program, 206-477-5300
  - After 5 p.m. and on weekends: South and East King County, Vashon Island, 206-263-1760
  - After 5 p.m. and on weekends: Seattle and North King County, 206-263-3801
- Describe staff training required to respond to spills safely and effectively.
- Update the spill response plan as your processes change.

## Records management

It is each winery's responsibility to demonstrate compliance with discharge limits. One way to show compliance is to maintain records of all treatment activities. The following are BMPs for keeping records to document your facility's compliance with discharge requirements:

- Maintain records documenting off-site waste removal including waste stream, volume, date, and method of disposal of accumulated wastes.
- Maintain records of all effluent sample results collected to determine compliance with King County local limits.
- Retain records on-site for a minimum of 3 years.

## Facility planning and design

To avoid expensive mistakes, it is important to retain the services of an engineer experienced in the design of winery wastewater treatment systems when working on your facility layout. Additionally, consider the following during facility planning:

- Provide an easily accessible sampling site that is representative of the discharge from the wine making operation, separate from sanitary drains from restaurants and tasting rooms (see Figure 1).
- All drains from winemaking operations should lead to a common drain, sump, or wastewater tank where the wastewater can be accessed and managed to ensure compliance with discharge limits.
- Use a smooth, durable surface (such as an epoxy coating) on floors for easy cleaning.
- Design for easily serviceable baskets or screens in trench drains. Screens only work if they are kept clean; train staff to empty them regularly and put them back after cleaning.
- Batch treatment to meet pH limits is still the best option for many small wineries. Necessary features typically include a tank, mixer, pH meter in tank (to control neutralizing chemicals), continuous pH meter (for the discharge), and a delivery system for the acids and bases used for neutralization (see Figure 2 and Figure 3).
- Set aside sufficient floor space for a wastewater pH equalization/treatment tank, treatment chemical containers, and solids handling equipment and storage.
- Cover the reception area and crush pad to shade the waste material. The juice and grape skins will be easier to remove from equipment, and the covering will limit stormwater from entering any drains near the crush pad.
- Industrial activities generating wastewater performed outside should be routed to the sewer.
- Consider the method(s) and/or equipment you will use to measure wastewater discharge volume from the winemaking operation.

## Water conservation

Conserving water can reduce the amount of wastewater you produce and save money. The following are BMPs to conserve water:

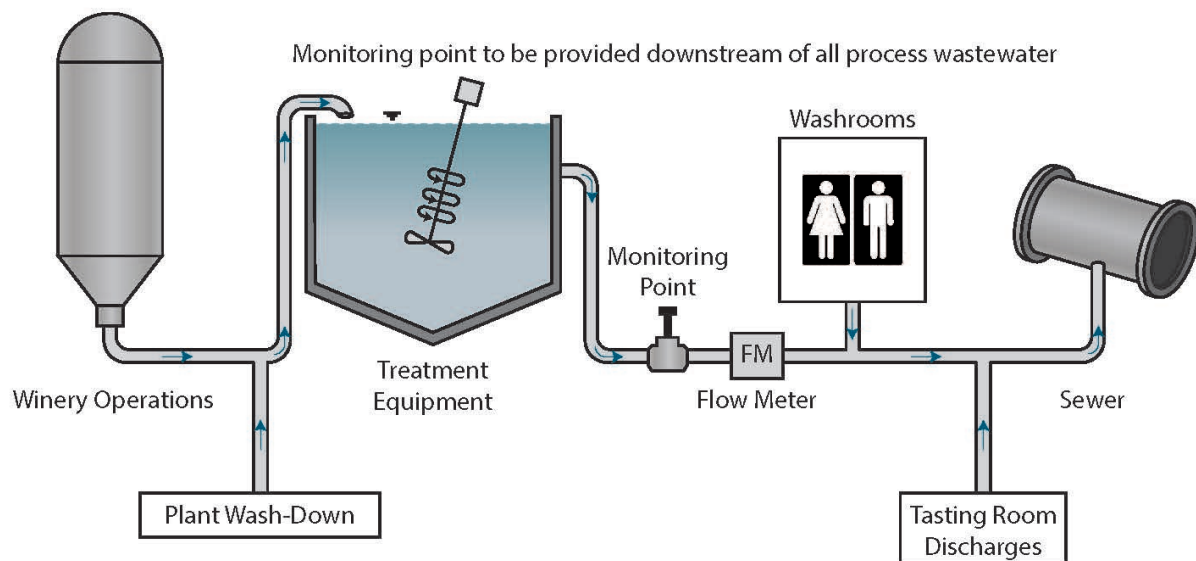
- Track and monitor your water usage by installing water meters in various areas of the operation; establish a baseline and set water-saving goals.
- Use dry cleanup procedures prior to wet cleanup.
- Use pressure washers during cleanup operations, when cleaning with water is necessary. These washers emit a high-pressure, low volume spray.
- For handheld washing operations, use pistol-grip, water-efficient nozzles with an automatic shutoff.
- If soaking barrels:
  - Use only enough water to soak the end of the barrel.
  - Hydrate multiple barrels consecutively.
- Use cascade washing of equipment when possible to reduce water and chemical use.
- Minimize the number of tank transfers and use in-tank blending. Fewer wine transfers mean less tank washing.
- Use sanitation methods and products that do not require a final rinse when possible.

### How can I get more information about winery BMPs?

Visit KCIW's website at [www.kingcounty.gov/industrialwaste](http://www.kingcounty.gov/industrialwaste) and search for "wineries."

Contact KCIW at 206-477-5300 and TTY Relay: 711, or [Info.KCIW@kingcounty.gov](mailto:Info.KCIW@kingcounty.gov)

Figure 1. Winery wastewater process flow including monitoring point and flow meter



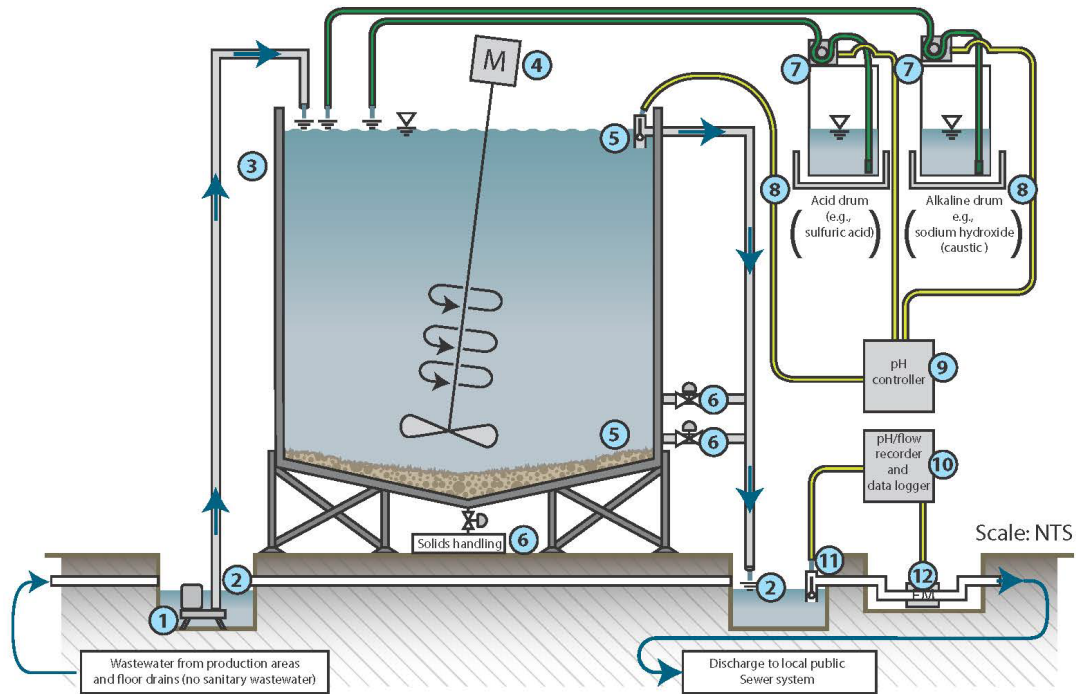
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Note: A monitoring point is needed to sample winery wastewater only, not other sources of wastewater.

Figure 2. pH neutralization for flow-through or multiple batch

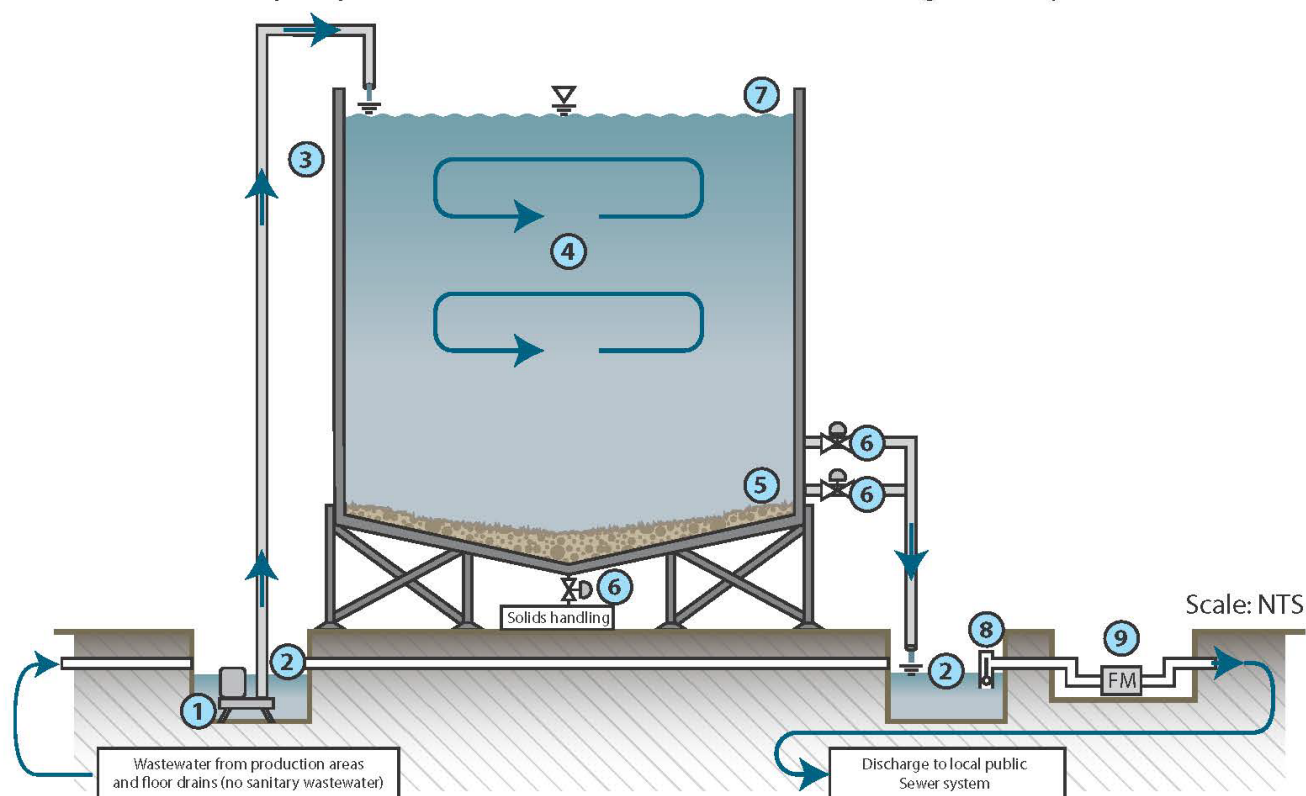
Winery Wastewater BMP Guidance -  
Example pH Neutralization Schematic - Flow-Through or Multiple Batch



- 1 Sump pump(s) with level controls set to prevent gravity overflow through the sewer outlet under peak flow conditions from the production area. Check valve and flow control valve not shown.
- 2 Sump or lift station with protective grating.
- 3 Tank for self-neutralizing of acidic and alkaline industrial wastewater and for adjusting pH by addition of concentrated neutralizing chemicals. Conical tank with stand shown. A flat-bottom tank can be used as well, but solids handling is a bit more labor-intensive. The piping and valving shown allows for the tank to be operated in flow-through mode through the upper overflow line or in batch decant mode through the lower decant lines.
- 4 Mechanical mixer with impeller or propeller blades to facilitate the neutralizing of acidic and alkaline industrial wastewaters. Mixer should be set at a slight angle and sized to turnover the tank volume at least a few times within the hydraulic retention time. Mixer mounting not shown to provide clarity to the schematic and as styles vary.
- 5 Controlling pH probe used, along with the pH controller (9), to regulate the delivery of neutralizing chemicals to the tank. The controlling pH probe can be moved to other locations within the tank based on the particular tank geometry and experience with what works best for stable pH control. For discharges in batch mode, the controlling pH probe needs to be a located where it can be constantly submerged.
- 6 Valves in a normally-closed position. Side decant valves to be opened when decanting the neutralized and clarified tank wastewater in batch decant mode. Tank bottom valve to be opened for removal of settled solids or for tank cleaning.
- 7 Chemical metering pump integrated with the controlling pH probe (5) through the pH controller (9). pH setpoints established to deliver acidic or alkaline concentrated neutralizing chemicals with a sufficient safety factor to ensure that the discharge pH probe (11) remains within local discharge limits.
- 8 Separate secondary containment for the concentrated acid and alkaline neutralizing chemicals.
- 9 pH controller integrated with the controlling pH probe (5) and chemical metering pumps (7).
- 10 pH and flow recorder and datalogger connected to the discharge pH probe (11) and flow meter (12) to monitor the pH and volume of the industrial wastewater discharged to the sanitary sewer. Any sanitary wastewater (e.g., restrooms, etc.) must enter downstream from the discharge pH probe (11) and flow meter (12).
- 11 Discharge pH probe positioned in a vented "T" to allow for ease of access and to remain constantly submerged.
- 12 Flow meter in valve box or other suitable structure with protective grating. The meter is to be installed per manufacturer's instructions and have datalogging capability. Ability for the flow meter to integrate with an autosampler to collect flow-proportioned samples also may be required for large volume dischargers.

Figure 3. pH neutralization for a single daily batch

### Winery Wastewater BMP Guidance - Example pH Neutralization Schematic - Single Daily Batch



- ① Sump pump(s) with level controls set to prevent gravity overflow through the sewer outlet under peak flow conditions from the production area. Check valve and flow control valve not shown.
- ② Sump or lift station with protective grating.
- ③ Tank for self-neutralizing of acidic and alkaline industrial wastewater and for adjusting pH by addition of concentrated neutralizing chemicals. Wastewater to be collected for an entire workday to allow for batch treatment and discharge at the end of the workday. Conical tank with stand shown. A flat-bottom tank can be used as well, but solids handling is a bit more labor-intensive. The piping and valving shown allows for the tank to be operated in batch decant mode through the lower decant lines.
- ④ Use a mechanical mixer or hand paddle (for small tanks) to facilitate the neutralizing of acidic and alkaline industrial wastewaters.
- ⑤ Test wastewater batch with a pH probe to regulate the delivery of neutralizing chemicals to the tank. The pH probe needs to be located where it can be constantly submerged.
- ⑥ Valves in a normally-closed position. Side decant valves to be opened when decanting the neutralized and clarified tank wastewater in batch decant mode. Tank bottom valve to be opened for removal of settled solids or for tank cleaning.
- ⑦ Neutralizing chemicals to be added manually or with aid of a chemical metering pump.
- ⑧ Discharge pH probe positioned in a vented "T" to allow for ease of access and to remain constantly submerged during batch discharge.
- ⑨ Flow meter in valve box or other suitable structure with protective grating. The meter is to be installed per manufacturer's instructions and have datalogging capability.