



Site Selection for Food Processing Facilities

Food processors face an ever changing production schedule which depends largely on the growers products, their finished product customers, labor, and the current market pricing. Many facilities are relocating or looking to relocate to decrease the fixed cost of overhead and labor to try and obtain a competitive advantage over their competitors, which can be only a few cents per pound of finished product. Relocating a facility or expanding into increased or alternative products requires a lot of research and investigation as to the actual costs. The costs for processing equipment, power, \$ per square foot of processing space, etc. are readily known factors. The variable factors such as market price, crop yield and quality from the growers is up to acts of nature. One of the most expensive variable costs is treating the process wastewater.

A Fresh Cut processor obtained the services from a professional with an MBA degree to develop a business plan for locating and starting a new strawberry processing facility. All of the capital and variable costs for the new facility were analyzed such as growers costs, trucking to and from the plant, cooling, labor, capital costs of the new building and equipment, and the fresh water costs. The facility was permitted, built and about to start when it was realized that the wastewater costs had not been determined.

Upon investigation, the wastewater flow was estimated at 60 gpm with a BOD of 4,000 ppm, and a TSS of 1,200 ppm. Preliminary calculations showed that the local POTW was going to charge \$20,000 per month based on POTW's surcharge rate structure.

An immediate fix was to install a water recycle system to decrease the total gallons of water discharged to the POTW. The water recycle system included a 3 chambered sump. The plant effluent flows into the first sump where it is pumped over a 30 micron parabolic screen and flows by gravity into the second sump. The water is pumped from the second sump through a bank of filters that remove 80% of the solids. The largest sump is sump 3 which is chlorinated and also used as water storage for the return water pump. The return water is pumped back inside the plant for flume type applications and bin washing. The return water system has decreased the plant overall water consumption by 40% and their corresponding wastewater surcharges.

After startup, it was determined that the surcharge costs (\$20K/month) could have been avoided if the site selection included an evaluation of the effluent wastewater costs.

How to investigate the wastewater costs for a facility:

The first step is to determine if the wastewater is to go to a POTW or discharge to ponds which is most typical for Fresh Cut processors. If the wastewater is to be discharged to a POTW, great information exists about most types of food processing wastewater and can be found very easily by contacting the POTW's. POTW's treat the wastewater from many food processors and the levels of BOD, TSS and flow for these facilities is public information under the Freedom of Information Act. Next contact the POTW that will be

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receiving your facilities wastewater and obtain their surcharge rate structure. Based on this information, it is straight forward to calculate the new plants wastewater costs.

The same steps are used for Fresh Cut Processors that discharge to ponds in that their exists several POTW's that will have the wastewater constituent levels for BOD, TSS and also flow. Usually there are screen to remove the bulk particle from the wastewater and they will remove about 20% of the BOD. If there is a DAF or clarifier, there will be an additional removal efficiency of 10-50% depending on the equipment and the usage of polymers. Therefore, take the effluent levels in BOD and TSS and determine the removal of the equipment upstream from the ponds.

Ponds are typically regulated by a local regional water agency. In their permit process, they will have a level of treatment that is required. Rules of thumb are that it takes 2 lbs. of oxygen per lb. of BOD for aeration to degrade the BOD (aerator companies will inform you of the aerator costs). The aeration pond is typically followed by a settling pond (solids settle to the bottom) prior to discharge or percolation. There needs to be about 0.5 ppm of alkalinity per ppm of BOD degraded so be sure to account for the addition of caustic or soda ash. This will give a rough operating cost for a pond system.

In summary, the wastewater costs for Fresh Cut processors can be a high percentage of the company profits and can diminish profits if it is not accounted for accurately for changes in production processes or relocating a processing facility. Once a site is selected or a facility (with a changed process) already exists, there are still many cost effective solutions to decrease the costs of disposing the facilities wastewater.

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