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A Case Study in Designing for High Strength Wastewater:

for regular grease trap and septic tank pump-outs; Using Bio-Augmentation as a valuable tool for remediation, optimization and system start-up.

Where the sewage strength is domestic and cleaning habits and kitchen practices can be controlled (using safe-for-septic practices), on-site wastewater treatment systems are inherently simple to operate and maintain, and a good design can usually be accomplished by taking steps 1 & 2 of the holistic approach and paying little attention to or even overlooking steps 3 & 4. However, in situations where sewage entering the septic system is harsh, a full holistic approach (Steps 1-4) is required to formulate a successful design. This paper is a case study of how the holistic approach was taken to design an on-site treatment system for a truck stop, consisting of a gas station and coffee shop, which produces difficult-to-treat sewage. The success of this design is also discussed through historical performance data of the treatment system.

Steps 1 & 2: Design Elements & Wastewater Characterization

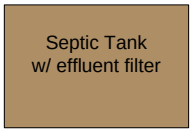
is also exasperated by the fact that the quantity of chemical used was far more than what was required to effectively clean the surface.

3) **Fats, oil and grease –**

Recommendations to change kitchen and cleaning practices are much easier to implement and are readily accepted at facilities with highly trained staff such as high-end golf courses *(Jowett et al., 2001).* However, corporate policies for maintaining high levels of health and safety at this national coffee chain are strict and must be adhered to for safety. Recommendations of changes must be within their corporate policy framework and show that health & safety standards are not affected.

The purpose of this exercise was to further investigate the nature of the facility, and how policies and procedures affect the treatment system. The wastewater treatment system does not start at the inlet pipe to the septic tank, but starts inside the facility. Although the recommendations would have been effective in decreasing the strength of the sewage, it is not possible to implement all of them, in particular changing cleaning and kitchen practices.

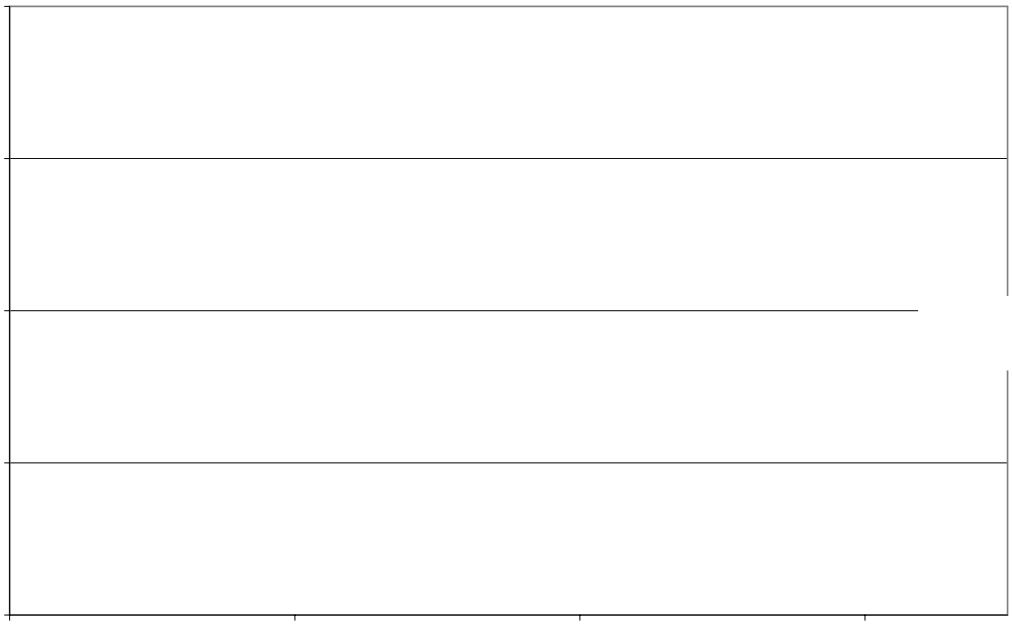
After completing Step 3, Dobri Engineering gained better insight into the usage of the facility which prompted a review and amendment to the design. The design flow was downsized to 20,000 L/day after the owner decided not to proceed with a restaurant. The final design, shown in Figure 4, incorporates new additions such as a grease trap, aeration tank with aerobic sludge return and an Aquamend Denitrification unit. Although the design flow had decreased, the size of the Waterloo Biofilter remained the same to provide more treatment medium to treat the high strength wastewater.


Septic Tank
w/ effluent filter

effluent, aeration effluent and Biofilter effluent were taken and under normal circumstances, the effluent gets progressively clearer. However, there was no visible difference between the three samples and the food odour emanating from all three samples. These findings showed the system wa

Decreasing the BOD and TKN loading into the treatment system was accomplished by mandating pump-outs of interior and exterior grease traps. The interior grease trap was to be pumped out on a monthly basis and the exterior grease trap to be pumped out on bi-monthly basis. This frequency was necessary to decrease the likeliness of short-circuiting.

Bio-Augmentation – Using Proprietary Bacteria



As shown in Figures 9 & 10, Biofilter effluent improved dramatically for cBOD and nitrification starting to take place. Visual inspections show that the effluent was clear and odourless, with a slight yellowish tinge, most likely due to the presence of colour causing compounds such as lignins and tannins (*Jowett et al., 2001*).

Conclusions

This case study shows how a poorly performing system was improved by adding proprietary bacteria and incorporating better O+M practices. After these steps were taken, the system responded quickly with excellent BOD removal and showed a dramatic improvement in nitrification efficiency. This shows that a holistic approach is essential in designing an on-site wastewater treatment system, especially for difficult wastewaters. The approach is essential because it allows f(s.)t6sencel1t6sceliiTc 0 Tw0.0 a

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