

ABSTRAK

Pencemaran air sungai, seperti yang terjadi pada Sungai Citarum, adalah masalah serius yang disebabkan oleh limbah rumah tangga, industri, dan peternakan. Pembangunan Gereja BFA Baros menimbulkan masalah pencemaran air akibat limbah cair domestik dari aktivitas kamar mandi (MCK) yang tidak diolah secara maksimal. Tujuan penelitian dilakukan untuk berkontribusi dalam menurunkan kadar pencemaran air sungai, merancang teknologi pengolahan air limbah yang sesuai dengan kemampuan manajemen gereja, mencegah dampak negatif pencemaran lingkungan dan ancaman kesehatan bagi masyarakat sekitar. Penelitian ini mengkaji metode pengolahan air limbah domestik. Sistem pengolahan yang dirancang harus sesuai dengan karakteristik limbah, seperti kadar BOD, COD, TSS, dan tingkat kekeruhan. Menghitung volume dan debit air limbah berdasarkan jumlah pengguna, penggunaan air bersih, dan parameter lainnya untuk menentukan kapasitas IPAL. Menghitung dimensi setiap bak dalam IPAL (seperti bak ekualisasi, koagulasi-flokulasi, sedimentasi, dan bak pengumpul) menggunakan rumus-rumus teknis. Hasil akhir dari pengolahan limbah harus memenuhi baku mutu yang berlaku agar tidak mencemari lingkungan. Timbulan air limbah harian dari gereja mencapai 12.000 liter atau 12 m³/hari. Berdasarkan jumlah tersebut, didapatkan debit rata-rata 0,5 m³/jam atau 0,14 liter/detik, yang digunakan sebagai dasar perhitungan desain IPAL. Dengan dimensi bak penyaringan awal memiliki volume 1 m³. Bak pengendap (sedimentasi) volume 8 m³. Bak aerasi volume 8 m³. Tabung multi media filter terdiri dari 3 dengan volume masing-masing 0,25 m³. Bak penampungan akhir (tangki produk) dengan volume 1 m³. Rencana Anggaran Biaya (RAB) dari perencanaan Instalasi Pembuangan Air Limbah Domestik (IPALD) Gereja BFA Baros Kota Cimahi adalah sebesar Rp 137.709.000,00.

Kata Kunci: Instalasi Pengolahan Air Limbah, Detail Engineering Design, Bill of Quantity, Rencana Anggaran Biaya

ABSTRACT

River water pollution, as seen in the Citarum River, is a serious issue caused by domestic, industrial, and livestock waste. The construction of the BFA Baros Church created a water pollution problem due to domestic wastewater from bathroom activities that was not treated effectively. The purpose of this research was to contribute to reducing river water pollution levels, design a wastewater treatment technology suitable for the church's management capabilities, and prevent negative environmental impacts and health threats to the surrounding community. This study examined methods for domestic wastewater treatment. The designed treatment system had to be compatible with the waste characteristics, such as BOD, COD, TSS levels, and turbidity. The volume and flow rate of wastewater were calculated based on the number of users, clean water usage, and other parameters to determine the capacity of the wastewater treatment plant (WWTP). The dimensions of each tank in the WWTP (such as equalization, coagulation-flocculation, sedimentation, and collection tanks) were calculated using technical formulas. The final result of the waste treatment had to meet applicable quality standards to avoid environmental pollution. The daily wastewater generation from the church reached 12,000 liters or 12 m³/day. Based on this amount, an average flow rate of 0.5 m³/hour or 0.14 liters/second was obtained, which was used as the basis for the WWTP design calculations. The dimensions of the preliminary screening tank had a volume of 1 m³. The sedimentation tank had a volume of 8 m³. The aeration tank had a volume of 8 m³. The multi-media filter tube consisted of 3 units, each with a volume of 0.25 m³. The final collection tank (product tank) had a volume of 1 m³. The budget plan for the design of the BFA Baros Cimahi City Church's Domestic Wastewater Treatment Plant (DWWTP) was IDR 137,709,000.00.

Keywords: Wastewater Treatment Plant, Detailed Engineering Design, Bill of Quantity, Budget Plan