

**OPTIMALISASI INSTALASI PENGOLAHAN AIR LIMBAH (IPAL)
DOMESTIK X DI KECAMATAN SETIABUDI, KOTA JAKARTA
SELATAN, DAERAH KHUSUS IBUKOTA JAKARTA**

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INTISARI

Kegiatan masyarakat menghasilkan air limbah domestik yang mengandung zat pencemar seperti BOD, COD, TSS, dan amoniak. Jika tidak diolah, limbah ini dapat menurunkan kualitas air sungai. Kecamatan Setiabudi, Jakarta Selatan, memiliki IPAL Domestik X yang mengolah air limbah rumah tangga di zona 0 Jakarta. Penelitian ini bertujuan menganalisis kualitas influen dan efluen IPAL Domestik X, mengevaluasi kualitas air Sungai X setelah menerima efluen berdasarkan Indeks Pencemaran dan Standar Stream, menilai efisiensi serta kriteria desain IPAL, dan merekomendasikan arahan pengelolaan untuk optimalisasi operasional IPAL.

Penelitian menggunakan metode kuantitatif melalui survei, pemetaan, pengambilan sampel purposive, dan pengujian laboratorium. Hasil penelitian menunjukkan bahwa efluen IPAL Domestik X memenuhi baku mutu Permen LHK No. 68 Tahun 2016, namun tetap meningkatkan beban pencemar sungai (IP 2,886, tercemar ringan). Analisis Standar Stream mengindikasikan BOD (10,06 mg/L) dan amoniak (0,59 mg/L) melebihi baku mutu kelas II PP No. 22 Tahun 2021, sehingga diperlukan pengolahan lebih optimal. Efisiensi IPAL dalam mengolah BOD, COD, TSS, dan amoniak masing-masing sebesar 73,21%, 83,43%, 86,44%, dan 90,87%, tetapi desainnya belum sepenuhnya sesuai Permen PUPR No. 4 Tahun 2017.

Arahan pengelolaan mencakup pendekatan teknologi dengan penyesuaian bak MBBR melalui pengurangan fraksi pengisian media menjadi 60% untuk mencegah zona mati serta optimalisasi bak HRC dengan peningkatan rasio *plate settler* melalui penyempitan jarak antarplat menjadi 2 cm. Selain itu, pendekatan sosial dilakukan melalui sosialisasi kepada masyarakat, sementara pendekatan institusi mencakup monitoring kinerja dan pembinaan pengurus IPAL. Upaya ini bertujuan untuk memastikan kualitas efluen tetap sesuai baku mutu serta meminimalkan beban pencemar yang diterima sungai.

Kata kunci: Limbah domestik, IPAL domestik, Optimalisasi, Indeks Pencemaran, standar stream

**OPTIMIZATION OF THE X DOMESTIC WASTEWATER TREATMENT
PLANT (WWTP) IN SETIABUDI DISTRICT, SOUTH JAKARTA CITY,
SPECIAL CAPITAL REGION OF JAKARTA**

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ABSTRACT

Community activities generate domestic wastewater containing pollutants such as BOD, COD, TSS, and ammonia. If left untreated, this wastewater can degrade river water quality. Setiabudi District, South Jakarta, has Domestic WWTP X, which treats household wastewater in Jakarta's Zone 0. This study aims to analyze the influent and effluent quality of Domestic WWTP X, evaluate the water quality of River X after receiving effluent based on the Pollution Index and Stream Standard, assess WWTP efficiency and design criteria, and recommend management strategies to optimize WWTP operations.

This study employs a quantitative method through surveys, mapping, purposive sampling, and laboratory testing. The results indicate that the effluent from Domestic WWTP X meets the quality standards of Minister of Environment and Forestry Regulation No. 68 of 2016 but still increases the river's pollutant load (Pollution Index 2.886, lightly polluted). Stream Standard analysis shows that BOD (10.06 mg/L) and ammonia (0.59 mg/L) exceed the Class II water quality standard of Government Regulation No. 22 of 2021, requiring further optimization. WWTP efficiency in treating BOD, COD, TSS, and ammonia is 73.21%, 83.43%, 86.44%, and 90.87%, respectively, but its design does not fully comply with Minister of Public Works and Housing Regulation No. 4 of 2017.

Management recommendations include a technological approach by adjusting the MBBR tank, reducing the media filling fraction to 60% to prevent dead zones, and optimizing the HRC tank by increasing the plate settler ratio by narrowing the plate spacing to 2 cm. Additionally, a social approach involves public awareness campaigns, while an institutional approach includes performance monitoring and WWTP operator training. These efforts aim to ensure effluent quality remains within standards and minimize the pollutant load received by the river.

Keywords: Domestic wastewater, Domestic WWTP, Optimization, Pollution Index, Standard Stream