

**ANALISIS PENGARUH KOLAM RETENSI DAN TATA GUNA LAHAN
TERHADAP REDUKSI LIMPASAN DI SUNGAI PERKOTAAN
(STUDI KASUS KOLAM RETENSI PASIRKALIKI DI DAS SUNGAI
CILEMBER, KOTA CIMAHI, JAWA BARAT)**

Zulfian Azhari (2212231046)

Pembimbing 1 : Dr. Ir. Adhi Yanuar Dipl. HE

Pembimbing 2 : Gandjar Gelar Rahardja, ST, MT

ABSTRAK

Perubahan tata guna lahan dan peningkatan intensitas curah hujan di Sub DAS Sungai Cilember telah menurunkan kinerja desain Kolam Retensi Pasirkaliki yang direncanakan pada DED tahun 2020, sehingga diperlukan kajian ulang menggunakan data tata guna lahan dan curah hujan terbaru. Kajian ini dilakukan melalui simulasi hidrologi–hidraulika berbasis data curah hujan dan tata guna lahan terkini, serta pengujian beberapa skenario optimasi kolam retensi. Berdasarkan desain awal, kolam retensi mampu menurunkan muka air sungai di bagian hilir sebesar 15–20 cm. Namun, hasil simulasi setelah dikaji ulang menunjukkan bahwa kolam retensi hanya mampu menurunkan puncak debit banjir sebesar 1,4 m³/s, dengan penurunan muka air sungai hilir berkisar antara 6–20 cm untuk debit kala ulang 2 tahunan (Q_2). Berbagai alternatif optimasi diuji untuk meningkatkan kinerja pengendalian banjir. Alternatif yang paling efektif adalah penambahan kolam retensi di wilayah hulu DAS Sungai Cilember, dengan reduksi puncak debit sebesar 10,7 m³/s atau 54,3% pada Q_2 , serta penurunan muka air sungai hilir hingga 58–98 cm. Proyeksi perubahan tata guna lahan dan curah hujan untuk periode 5, 15, dan 25 tahun menunjukkan peningkatan debit banjir yang cenderung linear. Pada kondisi tersebut, kolam retensi tambahan masih mampu menampung debit banjir Q_2 , meskipun efisiensi reduksi limpasan menurun bertahap.

Kata kunci : kolam retensi, limpasan permukaan, HEC-HMS, HEC-RAS, perubahan tata guna lahan.

**ANALYSIS OF THE EFFECT OF RETENTION BASINS AND LAND USE
ON RUNOFF REDUCTION IN URBAN RIVERS
(CASE STUDY OF THE PASIRKALIKI RETENTION BASIN IN THE
CILEMBER RIVER BASIN, CIMAHI CITY, WEST JAVA)**

Zulfian Azhari (2212231046)

Pembimbing 1 : Dr. Ir. Adhi Yanuar Dipl. HE

Pembimbing 2 : Gandjar Gelar Rahardja, ST, MT

ABSTRACT

Changes in land use and increasing rainfall intensity in the Cilember River Sub-Watershed have reduced the performance of the Pasirkaliki Retention Pond design prepared in the 2020 Detailed Engineering Design (DED), necessitating a reassessment using updated land-use and rainfall data. This study was conducted through hydrologic–hydraulic simulations based on recent rainfall and land-use data, combined with the evaluation of several retention pond optimization scenarios. Under the original design, the retention pond was able to reduce downstream river water levels by 15–20 cm. However, simulation results indicate that the pond can only reduce the peak flood discharge by 1.4 m³/s, with a downstream water level reduction of 6–20 cm for the 2-year return period discharge (Q_2). Various optimization alternatives were tested to improve flood control performance. The most effective alternative is the addition of a retention pond in the upstream area of the Cilember River watershed, achieving a peak discharge reduction of 10.7 m³/s (54.3%) for Q_2 and a downstream water level reduction of 58–98 cm. Projections of land-use and rainfall changes for the next 5, 15, and 25 years indicate a generally linear increase in flood discharge. Under these conditions, the additional upstream retention pond remains capable of accommodating the Q_2 flood, although runoff reduction efficiency gradually declines.

Keyword : retention pond, surface runoff, HEC-HMS, HEC-RAS, land-use change