



INTISARI

Sekitar tahun 2017 dan 2022 bulan Desember di Desa Gabus kota Pati Jawa Tengah terjadi luapan air dan banjir kiriman selama 7 hari berturut turut diakibatkan oleh saluran drainase tidak bisa menampung debit air dari hujan yang turun dan sebagian drainase ada yang tidak berfungsi karena mengalami endapan yang menutup saluran drainasinya dan terdapat beberapa titik saluran drainase dari hulu ke hilir yang memiliki perbedaan ukuran. Tujuan dari penelitian ini untuk mengkaji saluran drainase dengan kala ulang tertentu serta melakukan pemeliharaan infrastruktur saluran drainase dengan melakukan perubahan dimensi saluran dengan desain baru yang sebaiknya dibuat di Desa Gabus, Kota Pati Jawa Tengah.

Perhitungan analisis hidrologi meliputi uji probabilitas dan perhitungan kala ulang curah hujan. Adapun langkah yang dilakukan adalah mengambil data curah hujan pada web CHRS per sepuluh tahun, melakukan analisis distribusi frekuensi curah hujan dengan cara metode Gumbel dan metode Log Pearson III, melakukan analisis debit banjir rencana terhadap kapasitas saluran drainase serta memberikan rekomendasi pemeliharaan untuk saluran drainase di Desa Gabus Kecamatan Gabus Kabupaten Pati Jawa Tengah.

Berdasarkan analisis hidrologi, distribusi Gumbel dapat diterima untuk memodelkan data hujan dengan probabilitas = 0,244, hujan rata-rata = 63,247, dan standar deviasi = 17,177, karena nilai Chi Kuadrat matematis = 8,545 lebih kecil dari Chi Kuadrat teoritis = 9,21. Sebaliknya, distribusi Log Pearson III ditolak karena nilai Chi Kuadrat matematis = 14 lebih besar dari nilai teoritis. Perhitungan debit banjir rencana menghasilkan intensitas hujan maksimum = 68,9288 mm/jam dan debit banjir rencana = 0,1599286 m³/det. Meskipun sebagian besar kapasitas saluran drainase lebih besar dari debit banjir rencana, beberapa saluran masih memiliki kapasitas di bawah debit banjir rencana, menunjukkan perlunya perencanaan ulang serta inspeksi dan pemeliharaan rutin untuk memastikan keamanan saluran drainase.

Kata kunci : Drainase, Curah Hujan, Kala Ulang, Rekomendasi.



ABSTRACT

Around 2017 and 2022 in December in Gabus Village, Pati City, Central Java, there was an overflow of water and flash flood for 7 consecutive days due to the drainage channel not being able to accommodate the water discharge from the rain that fell and some of the drainage was not functioning because it had sediment that blocked the drainage channel and there were several drainage channel points from upstream to downstream that had different sizes. The purpose of this study was to study drainage channels with a certain return period and to maintain drainage channel infrastructure by changing the channel dimensions with a new design that should be made in Gabus Village, Pati City, Central Java.

The calculation of hydrological analysis includes probability tests and calculations of rainfall return periods. The steps taken were to take rainfall data on the CHRS website per ten years, conduct a frequency distribution analysis of rainfall using the Gumbel method and the Log Person III method, conduct an analysis of the planned flood discharge on the drainage channel capacity and provide recommendations for maintenance for drainage channels in Gabus Village, Gabus District, Pati Regency, Central Java.

Based on the hydrological analysis, the Gumbel distribution is acceptable for modeling rainfall data with a probability of 0.244, an average rainfall of 63.247, and a standard deviation of 17.177, because the mathematical Chi-Square value (8.545) is smaller than the theoretical Chi-Square (9.21). On the other hand, the Log Pearson III distribution is rejected because the mathematical Chi-Square value (14) is greater than the theoretical value. The calculation of the planned flood discharge results in a maximum rainfall intensity of 68.9288 mm/hour and a planned flood discharge of 0.1599286 m³/sec. Although most of the drainage channel capacities are greater than the planned flood discharge, some channels still have capacities below the planned flood discharge, indicating the need for re-planning as well as regular inspection and maintenance to ensure the safety of the drainage channels.

Keywords: Drainage, Rainfall, Discharge, Return Period, Recommendations.