

SARI

Desa Nawangan merupakan salah satu desa yang dilewati jalan provinsi yang sangat padat yang menghubungkan Arjosari-Nawangan. Kondisi jalan yang sempit menyebabkan adanya rencana pelebaran jalan. Dalam pelebaran jalan akan dijumpai tantangan seperti potensi kegagalan lereng termasuk gerakan tanah. Tujuan dari penelitian ini adalah mengetahui kondisi geologi teknik (geomorfologi, tanah dan batuan, struktur geologi, dan air tanah) di lokasi penelitian dan mengevaluasi kerentanan gerakan tanah dengan parameter sesuai SNI, 2016 (kemiringan lereng, jenis batuan, jarak dari struktur geologi, dan tata guna lahan). Metode penelitian dilakukan dengan pemetaan geologi teknik skala 1:25.000 dan analisis kerentanan gerakan tanah skala 1:25.000 dengan metode *Analytical Hierarchy Process* (AHP). Daerah penelitian memiliki satuan geomorfologi berupa punggung aliran lava berlereng curam-sangat curam dan punggung aliran lava berlereng miring-agak curam. Satuan geologi di daerah penelitian berupa lava andesit, breksi andesit, dan tuff. Berdasarkan tingkat pelapukan batuan, daerah penelitian tersusun atas lava andesit lapuk rendah, lava andesit lapuk sedang, lava andesit lapuk tinggi, breksi andesit lapuk sedang, dan tuff lapuk rendah. Daerah penelitian juga terdiri dari lima satuan geologi teknik kualitas massa batuan GSI, yaitu kualitas massa batuan baik (56-75), sedang (41-55), buruk (21-40), dan sangat buruk (<20). Struktur geologi yang berkembang di daerah penelitian berupa kekar dan sesar dengan orientasi baratlaut-tenggara. Kondisi air tanah di daerah penelitian berada jauh di bawah permukaan tanah. Berdasarkan hasil analisis dengan metode AHP, daerah penelitian dikelompokkan ke dalam 4 tingkat kerentanan gerakan tanah, yaitu zona kerentanan gerakan tanah sangat rendah (3%), zona kerentanan gerakan tanah rendah (10,3%), zona kerentanan gerakan tanah menengah (43,3%), dan zona kerentanan gerakan tanah tinggi (42,5%). Dilakukan validasi menggunakan kurva ROC dengan nilai *area under curve* sebesar 0,74 (baik).

Kata kunci: karakteristik geologi teknik, kerentanan gerakan tanah, *Analytical Hierarchy Process*, *Geological Strength Index*, Nawangan.

ABSTRACT

Nawangan Village is one of the villages traversed by a very busy provincial road connecting Arjosari and Nawangan. The narrow road condition has led to plans for road widening. However, this widening project faces challenges such as the potential for slope failure, including landslides. The aim of this study is to understand the engineering geological conditions (geomorphology, soil and rock types, geological structure, and groundwater) at the study site and to evaluate the landslide susceptibility using parameters according to SNI, 2016 (slope steepness, rock types, distance from geological structures, and land use). The research methodology includes engineering geological mapping at a scale of 1:25,000 and landslide susceptibility analysis at a scale of 1:25,000 using the Analytical Hierarchy Process (AHP) method. The area consists of geomorphological units such as steep to very steep lava flow ridges and gently sloping to moderately steep lava flow ridges. The geological units in the study area comprise andesite lava, andesite breccia, and tuff. Based on the degree of rock weathering, the study area is composed of slightly weathered andesite lava, moderately weathered andesite lava, highly weathered andesite lava, moderately weathered andesite breccia, and slightly weathered tuff. The study area also includes five engineering geological units based on the Geological Strength Index (GSI) of rock mass quality, namely good (56-75), moderate (41-55), poor (21-40), and very poor (<20) rock mass quality. The geological structures found in the study area include joints and strike-slip faults with a northwest-southeast orientation. The groundwater conditions in the study area are located deep below the surface. Based on the analysis using the AHP method, the study area is classified into four levels of landslide susceptibility: very low susceptibility zone (3%), low susceptibility zone (10.3%), medium susceptibility zone (43.3%), and high susceptibility zone (42.5%). Validation was conducted using the ROC curve, with an area under the curve value of 0.74 (good).

Keywords: *Characteristics of Engineering Geology, Landslide Susceptibility, Analytical Hierarchy Process, Geological Strength Index, Nawangan*