NUR IZZATI ATIQH BINTI MOHD RODZI BACHELOR OF SURVEYING SCIENCE AND GEOMATICS (HONOURS) AUGUST 2023

# DELINEATION OF GROUNDWATER POTENTIAL AREA (GWP) USING ANALYTICAL HIERARCHY PROCESS (AHP) AND FUZZY ANALYTICAL HIERARCHY PROCESS (FAHP) METHOD IN KEDAH

NUR IZZATI ATIQAH BINTI MOHD RODZI
2021459962

COLLEGE OF BUILT ENVIRONMENT
UNIVERSITI TEKNOLOGI MARA
PERLIS

AUGUST 2023

# DELINEATION OF GROUNDWATER POTENTIAL AREA (GWP) USING ANALYTICAL HIERARCHY PROCESS (AHP) AND FUZZY ANALYTICAL HIERARCHY PROCESS (FAHP) METHOD IN KEDAH

**NUR IZZATI ATIQAH BINTI MOHD RODZI**

**2021459962**

**Thesis submitted to the Universiti Teknologi MARA Malaysia**
**in partial fulfillment for the award of the degree of the**
**Bachelor of Surveying Science and Geomatics (Honours)**

**AUGUST 2023**

## DECLARATION

I declare that the work on this project/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). This project/dissertation is original and it is the result of my work, unless otherwise indicated or acknowledged as referenced work.

In the event that my project/dissertation be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree of the Bachelor of Surveying Science and Geomatics (Honours) and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

| | |
|---|---|
| Name of Student | : Nur Izzati Atiqah Binti Mohd Rodzi |
| Student's ID No | : 2021459962 |
| Project/Dissertation Title | : Delineation of Groundwater Potential Area (GWP) using Analytical Hierarchy Process (AHP) and Fuzzy Analytical Hierarchy Process (FAHP) Method in Kedah. |
| Signature and Date | |

Approved by:

I certify that I have examined the student's work and found that they are in accordance with the rules and regulations of the School and University and fulfils the requirements for the award of the degree of Bachelor of Surveying Science and Geomatics (Honours).

| | |
|---|---|
| Name of Supervisor | : Sr. Sharifah Norashikin binti Bohari |
| Signature and Date | : |

## ABSTRACT

The availability of groundwater is declining today, which has led to an increase in water demand. One of the main sources that significantly contribute to the annual total supply is groundwater. Water supply and demand have increased as a result of the rapid population growth, urbanization, agricultural development, and industrialization. Therefore, the objective of this study, that was conducted in Kedah, Malaysia, was to determine groundwater potential zones using approach of the Analytical Hierarchy Process (AHP) and Fuzzy Analytical Hierarchy Process (FAHP). Land use, soil, slope, elevation, rainfall, aspect, drainage density, geology, geomorphology, topographic wetness index (TWI), tube well, distance to fault, plan curvature, aquifer and lithology are among the 15 groundwater conditioning factors that were considered. All the parameters thematic layer were ultimately combined by a weighted sum overly analysis in a GIS environment using relative weights derived from the AHP and FAHP. The findings of this study displayed in maps of groundwater potential zones that classify as high, moderate and low. This study reveals that the FAHP method is more efficient in delineating GWPZ in this region with an accuracy of 91.7% better than AHP method at 90.2%. The findings of this study hold significant value for water management authorities, as it provides crucial insights for efficient planning, development and ensuring the long-term sustainability of our precious water resources.

## TABLE OF CONTENTS