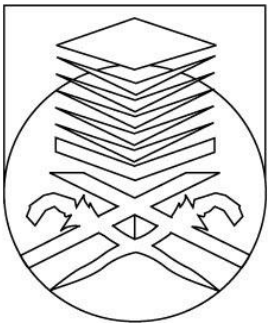
UNDERGROUND 3D UTILITY MAPPING: COMPARISON ASSESSMENT BETWEEN REFLEXW AND REVIT

MUHAMMAD HAZIQ ZAHIRUDDIN BIN HANAFI

2019267422



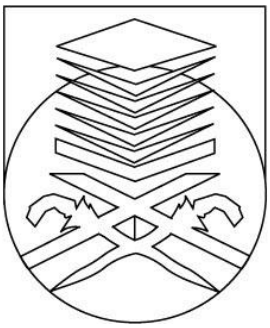
COLLEGE OF BUILT ENVIRONMENT
UNIVERSITI TEKNOLOGI MARA
PERLIS

AUGUST 2023

UNDERGROUND 3D UTILITY MAPPING: COMPARISON ASSESSMENT BETWEEN REFLEXW AND REVIT

MUHAMMAD HAZIQ ZAHIRUDDIN BIN HANAFI

2019267422



Thesis submitted to the Universiti Teknologi MARA Malaysiain partial fulfilment for the award of the degree of the Bachelor of Surveying Science and Geomatics (Honours)

AUGUST 2023

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Muhammad Haziq Zahiruddin bin Hanafi
Student I.D. No.	:	2019267422
Programme	:	Bachelor of Science, Surveying and Geomatics (Honours) - AP220
Faculty	:	College of Built Environment
Thesis	:	Underground 3D Utility Mapping: Comparison Assessment between ReflexW and Revit
Signature of Student	:	……..
Date	:	August 2023

ABSTRACT

Mapping utilities in three dimensions is essential for ensuring efficient urban development and protecting utility infrastructure in automated construction projects. Nonetheless, the ever-expanding urban areas, cities with limited land resources, and unknown subterranean spaces present significant obstacles to utility mapping and management. For instance, locating and identifying underground utility conduits is one of the most persistent challenges due to the presence of various mediums such as gas, water, oil, and others, making it particularly difficult to determine the diameter of these conduits. In addition, historic urban areas frequently have inadequately documented or ambiguous underground pipeline configurations, making accurate mapping even more difficult. The archival management of subsurface pipeline facilities is unorthodox and insufficiently documented. This study aims to compare the efficacy of 2D and 3D Ground Penetrating Radar (GPR) data visualization using ReflexW and Autodesk Revit. Using these cutting-edge technologies, the study seeks to evaluate the precision and dependability of 3D visualization capabilities in utility mapping. The data collection procedure in the Tok Arau Complex consists of several phases, including surveillance, GPR and PCL calibrations, and GPS-based RTK Network comprehensive surveying. The culmination of these efforts is the compilation of an exhaustive 3D model that facilitates a visual representation of the underground utility infrastructure. Additionally, the study employed the Root Mean Square Error (RMSE) as a metric to evaluate the veracity of the software's 3D visualization capabilities. The RMSE value, with a precision of 0.05, indicates that Revit software can be used to construct underground pipelines.