

**UNIVERSITI TEKNOLOGI MARA**

**WATER QUALITY STUDY OF  
MELAKA RIVER USING WQI,  
REMOTE SENSING AND GIS**

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Thesis submitted in fulfilment  
of the requirements for the degree of  
**Master of Science**

**Faculty of Architecture, Planning and Surveying**

January 2014

## 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 result 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 Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

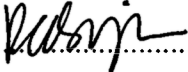
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## ABSTRACT

Melaka River is a popular tourism attraction in Melaka and it is crucial to ensure it is clean and crystal clear. In Malaysia, water pollution is identified using Water Quality Index (WQI), by the Department of Environment (DOE), since 1986. The WQI parameters are Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Ammoniacal Nitrogen ( $\text{NH}_3\text{-N}$ ), Suspended Solids (SS), and pH. Additional parameters of Temperature, Colour, Turbidity, Level (Depth) and Conductivity were used as support data. SPOT-5 Pansharpen Supermode All Bands as near-real-time data provides an ideal 2.5m high resolution within appropriate availability time provided with the Digital Elevation Model (DEM). The Geographical Information System (GIS) used as a mapping tool to conclude and better gathered all information and current condition of the river water and the potential pollution sources can be monitored. The combination of on-site data, laboratory testing data and satellite imagery data could support each method limitations that produce GIS mapping and analysis for future water quality control and management. The correlation of all six parameters of pH, SS, BOD, COD,  $\text{NH}_3\text{-N}$  and DO versus Band 1, Band 2, Band 3 and Band 4 show low values of regressions with the highest reading of 0.2970. All six parameters were being estimated using the SPOT 5 image. The regression values indicated that the best band to estimate the value of  $\text{NH}_3\text{-N}$  is Band 3, pH, BOD, COD and DO are using Band 2 and SS using Band 1. All additional parameters of Level, Colour, Conductivity, Temperature and Turbidity versus Band 1, Band 2, Band 3 and Band 4 show even lower values of regressions 0.1957. All five additional parameters were also being estimated using the SPOT 5 image. The regression values above indicated the best band to estimate Level is Band 4, Colour is Band 3, Conductivity and Temperature is Band 2 and Turbidity is Band 1. Red Zone Mapping of Very Critical parameters of DO, BOD, COD,  $\text{NH}_3\text{-N}$ , Temperature and Conductivity show that those parameters are the top priority to be monitored and managed.

## ACKNOWLEDGEMENTS

First of all I would like to thank ALLAH The Almighty to give me strength to get through the easiest and toughest moment of throughout this study process.

Thank you so much to my family for their love and support; emotionally and financially, never fail to lend me their magical hand whenever is needed especially my beloved husband Mohammad Morizal, my children Kamal, Maisara, Maimuna, Musa and Mariya, my parents Tuan Haji Abd. Aziz and Puan Hajah Habibah, my parents in-law Datu Dr. Haji Sulaiman and Datin Hajah Siti Hawa, my brothers and sisters and also to all my in-laws.

My hearties gratitude goes to my great supervisor, Assoc. Prof. Sr. Dr. Haji Mohammad Halmi bin Kamaruddin and all his dedicated staffs that never give up to help me in whatever needed from the beginning until the end of my thesis. Not to forget, the Institute of Graduate Studies, the Coordinator of Postgraduate Research Studies of AP780 and AP990, Faculty of Architecture, Planning and Surveying and all the dedicated staffs for their helping hands and concern. This study is funded by the Excellence Fund of Research Management Institute, UiTM. Thank you so much for providing fund upon this study. Special thanks to Kolej Poly-Tech MARA and Majlis Amanah Rakyat (MARA) for giving this opportunity for me to pursue my dreams here at UiTM Shah Alam.

Special thanks also goes to the Centre for Geospatial Technology, Faculty of Architecture, Planning and Surveying, Institute of Infrastructure Engineering and Sustainable Development, Faculty of Civil Engineering, UiTM, Malaysia Remote Sensing Agency (MRSA), Department of Environment Melaka (DOE), Department of Irrigation and Drainage Melaka (DID), Department of Survey and Mapping Malaysia and Department of Meteorology Malaysia for good cooperation in providing the respective information, data, laboratory and equipments needed throughout the study. May ALLAH bless us all.

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