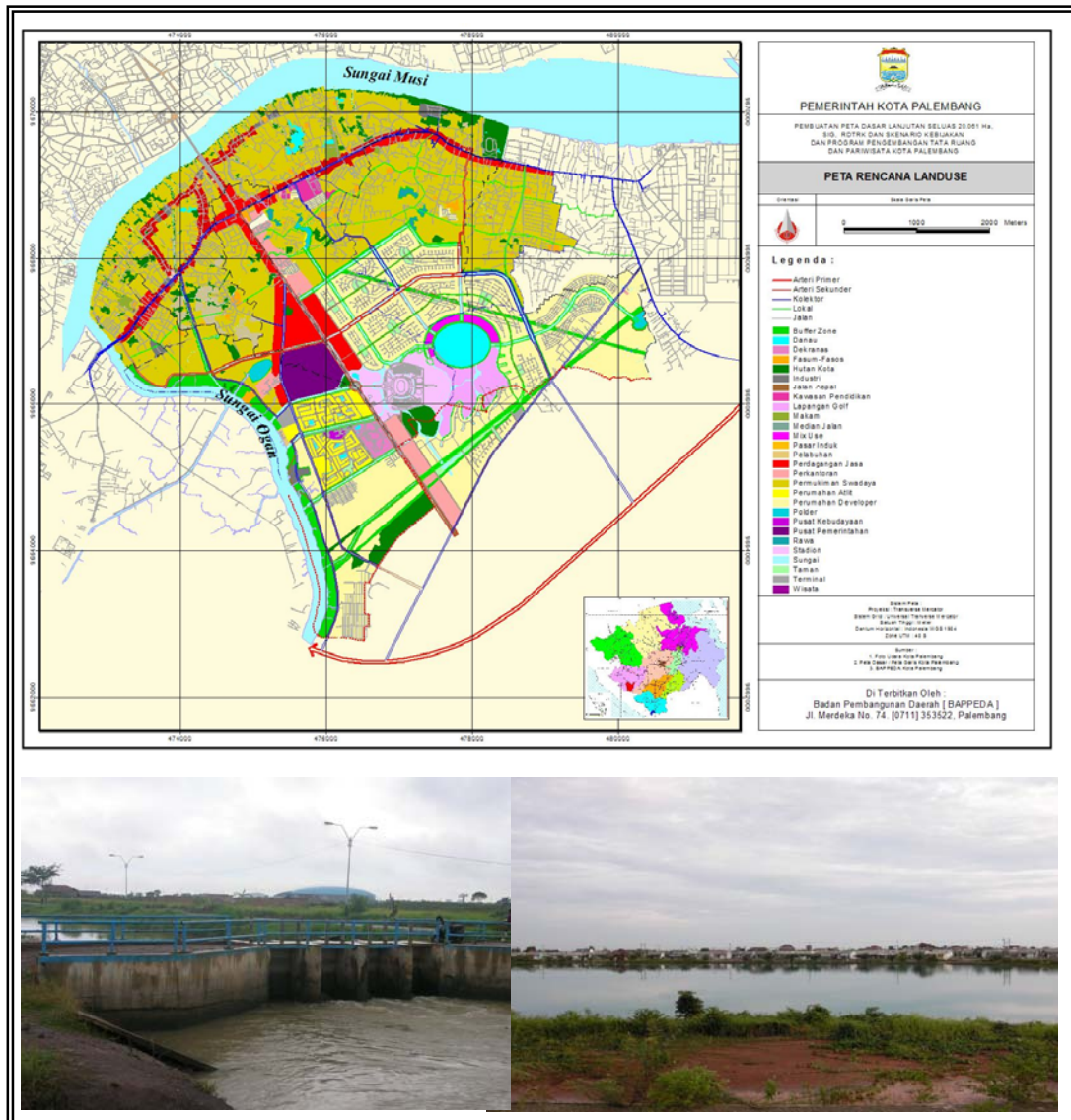


# UNESCO-IHE INSTITUTE FOR WATER EDUCATION AND SRIWIJAYA UNIVERSITY



## Palembang Urban Drainage and Flood Protection Development Case Study Jakabaring

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MSc Thesis WSE-HE-LWD-09.12  
 October 2009

# **Palembang Urban Drainage and Flood Protection Development Case Study Jakabaring**

Master of Science Thesis  
by

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This research is done for the partial fulfilment of requirements for the Master of Science degree at the UNESCO-IHE Institute for Water Education, Delft, the Netherlands and the Magister Sains degree at the Sriwijaya University, Palembang, Indonesia

**Delft  
October 2009**

## Summary

Palembang is located in South Sumatra Province. Due to population growth and urbanisation, Palembang is becoming a densely populated area. The government of Palembang has tried to solve this problem by developing some new areas. Most of these areas are lowland. One of reclaimed lowland areas is Jakabaring. It consists of about 2,400 ha which is about 6.5% of the total area of Palembang.

Lowland areas by their nature are generally unsuitable for development. This is mainly caused by the soil condition, waterlogging, regular or even permanent inundation and environmental values. Due to the physical condition, the development of lowland areas in Jakabaring also needs a careful approach and water management in order to protect the areas from flooding. Although the government of Palembang has already installed water management systems such as urban drains and retention ponds in Jakabaring to overcome flooding due to excessive rainfall and high water levels in of Musi River, some of the areas in Jakabaring are still subject to flooding and waterlogging. Improvements are needed to overcome these problems, therefore good urban drainage and flood protection need to be developed for Jakabaring.

The research has been carried out to study urban drainage and flood protection development in Jakabaring by using DUFLOW modelling and developing some scenarios that are suitable for the urban drainage system in Jakabaring.

The applied methodology of this thesis comprised: literature review, data collection, data analysis, model simulation, some development scenarios, evaluation and report. Literature review consists of some related literature that has been used in this thesis such as literature on urban drainage, flooding, flood control, polder, GIS, DUFLOW modelling. Data collection consisted of primary and secondary data. Primary data consist of measured water levels in the study area by using staff gauges and divers, measured cross and longitudinal sections of the urban drains. Secondary data consist of topography map of Palembang, rainfall and evaporation data from Kenten Sation, water level data from PT. PELINDO II and PDAM Tirta Musi, Master Plan of Urban Drainage in Palembang, the Report of Detailed Spatial Planning of Jakabaring (RDTRK Jakabaring).

By analyzing the rainfall and evaporation data, cross and longitudinal sections, discharge of each urban drain in the study area for developing the DUFLOW model, then a proper design of urban drainage and flood protection systems can be set up. Three scenarios have been developed: using open system, using flap gate, applying polder system. For this purpose, a return period of 100 years has been applied. Based on DUFLOW model evaluation and Digital Elevation Modelling, for existing condition in Jakabaring area using 1 m opening, there is 23.7 % of flooded areas, while by using 3 m opening, there will be 23.3.7 % of no flooding area. By using 1 m and 3 m flap gates instead of open system, the flooded areas will be less; it is about 19 – 19.5 %. To protect the area from flooding, constructing the dikes is considered to be taken. While in the future conditions, if there is a sea level rise of 2 mm/year, by using 1 m and 3 m opening, there will be only 53.2% will be free from flooding. In future condition (Sea Level Rise), by using 1 m flap gate there will be 23.7 % of flooded areas, while by using 3 m flap gate, there will be 23.3 % flooded areas. Based on this, using flap gates instead of sliding gate (open system) and developing polder system for the future will be recommended as the

solution in order to overcome flooding and drainage problems. In case of a combination between Sea Level Rise and land subsidence (1 cm/year) may occur, a polder system will be needed to control floods and drainage in the area. In this case drainage by gravity is not possible anymore.