Innovate UK | MiGHT Malaysian Industry-Government Group for High Technology | Newton-Ungku Omar Fund | SCIENCE to ACTION

Disaster Resilient Cities: Forecasting Local Level Climate Extremes and Physical Hazards for Kuala Lumpur

An Introduction to Flash Flood Modelling in Malaysia

Dr Iain Willis & Helen Smith

JBA Risk Management

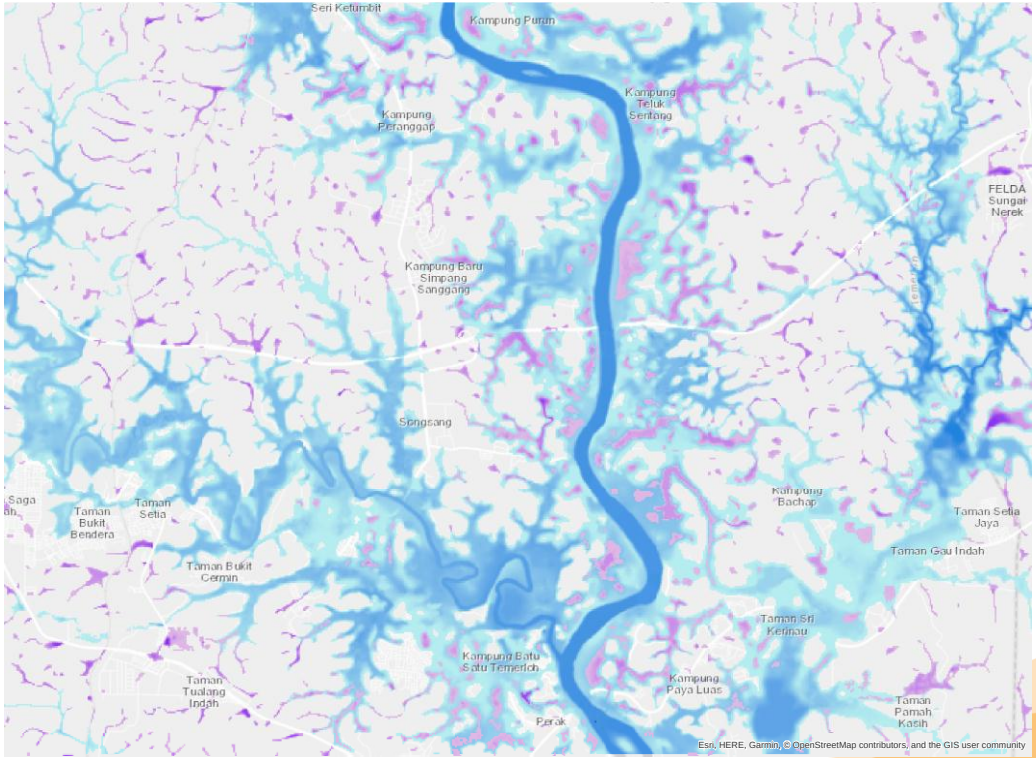
University of Cambridge | British Geological Survey, Natural Environment Research Council | seadpri | University of Malaya | MET Malaysia | UCL | CERC | UKM Pakarunding | CORE | GMT Geomapping Technology Sdn Bhd | JBA consulting | Cuesta | Geological Society of Malaysia | Asian Network on Climate Science and Technology (ANCST)

JBA
risk
management
THE
FLOOD
PEOPLE.

DEFINING FLASH FLOOD

Flash =

- Pluvial Origin
- Aka ‘Surface Water’
- Not fluvial ***but*** can be within a flood plain



Legend

MY_FLSW_UD_Q100_RD

Value

High

Low

MY_FLRF_UD_Q100_RD

Value

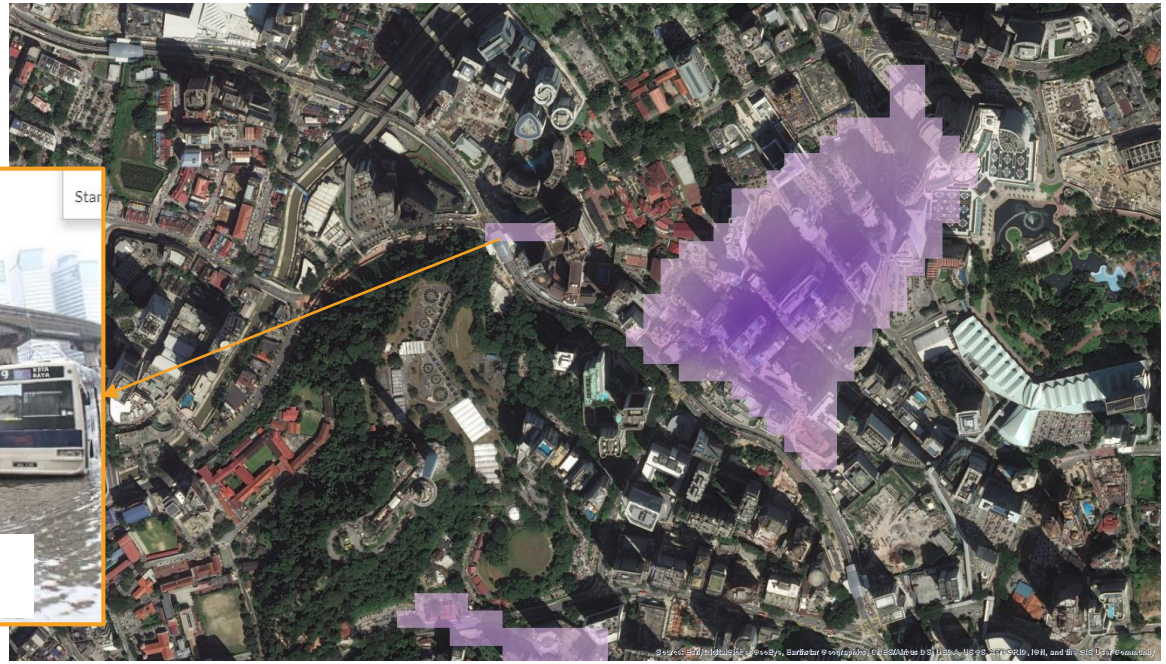
High

Low

Simpang Sanggang, Malaysia

KL FLOOD VALIDATION (2014)

Oct 2014; Jalan Sultan Ismail / Jalan Ampang.
Source: www.thestar.com.my



KL FLOOD VALIDATION (2016)

May 2016; Jalan Perpaduan
Source: http://all-about-malaysia.blogspot.com

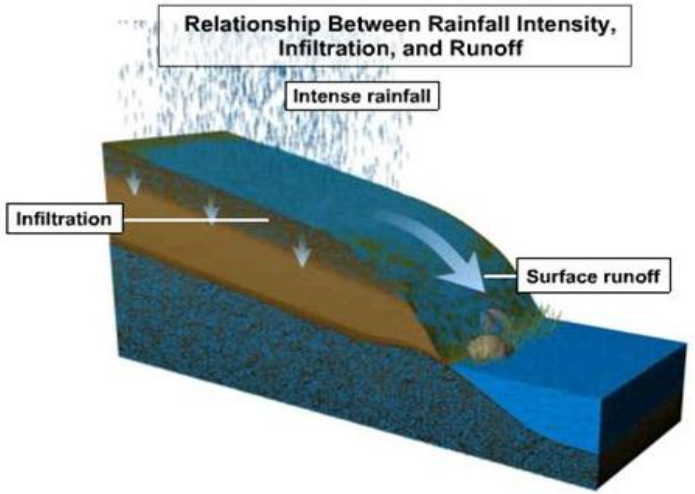
KL FLOOD VALIDATION (2011, 2017)

Dec 2011; Jalan Tun Razak
Source: www.vinann.com

Mar 2017; Jalan Tun Razak
Source: www.thesundaily.my

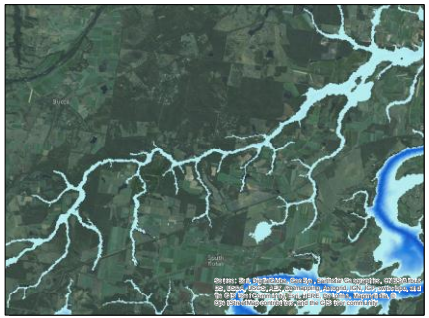
FACTORS IN FLASH FLOOD MODELLING

- Hydrology
  - Inputs
    - Rainfall Data
      - Gridded
      - Hourly
      - Duration
        - Historical period of Data
        - Storm durations (1hr, 3h, 24hr)
      - Probabilistic Analysis
      - Rainfall-Runoff model

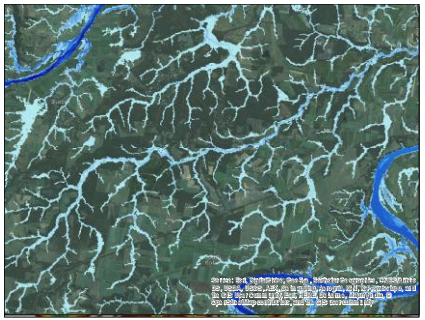


FACTORS IN FLASH FLOOD MODELLING

- Hydraulic Modelling
  - Inputs
    - DTM – Digital Terrain Model (not DSM)
    - Process – 2D hydraulic modelling (JFLOW)
    - Urban Drainage / Defences

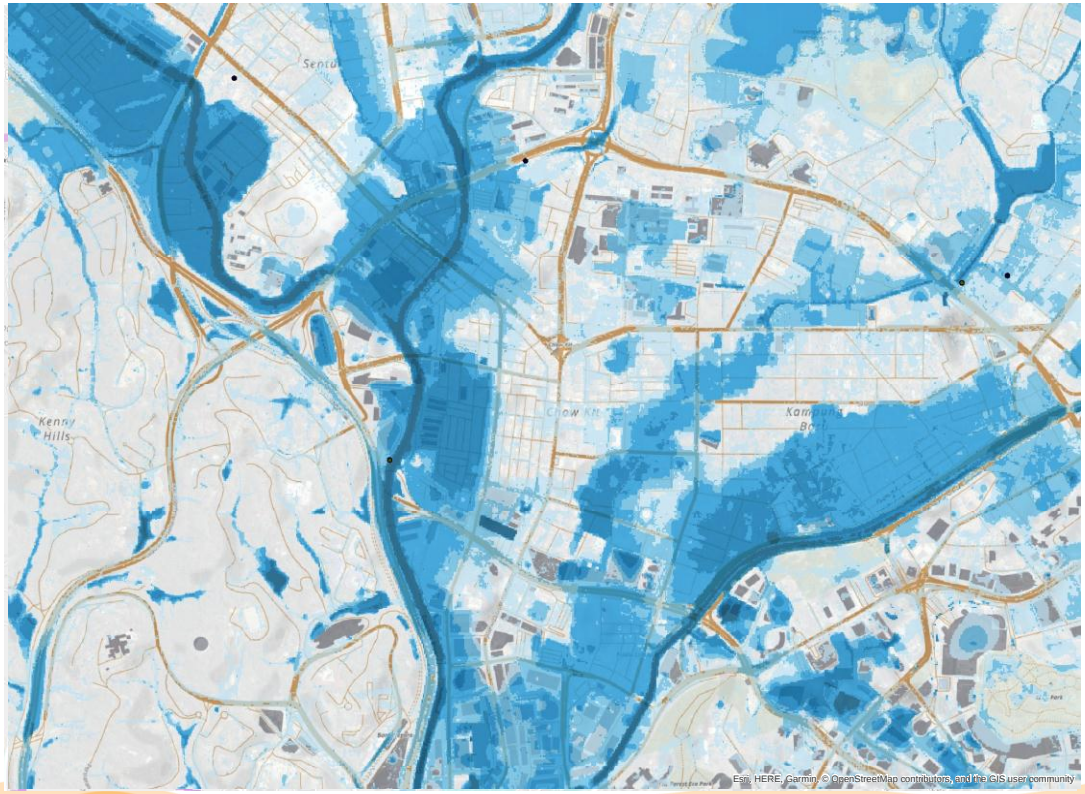


30m



5m

EARLY TESTING – KUALA LUMPUR



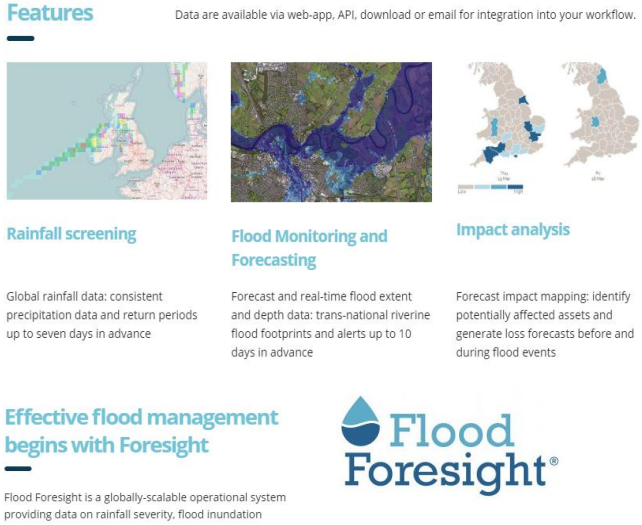
Chow Kit, 1hr Rainfall duration Test

JBA PRIORITIES: KL FLASH FLOOD MAPS

- Hydrology
- Sensitivity Testing
  - Storm Duration
  - DTM resolution (2m, 5m, 10m)
  - DTM boundary
  - Defence Assumptions
    - Drainage Effectiveness
    - Levees
- Validation

DRR CONSIDERATIONS: FLOOD MAPS

- ***Non-structural investments have the greatest cost-benefit (Kelman 2014)***
  - Flood maps
    - Future land use / Planning
    - Forecasting & Emergency Response
  - JBA Flood Foresight
    - Predicts flood severity in days advance
    - Mitigate / Plan / Respond



THE SMALL PRINT

© JBA Risk Management Limited 2018. All rights reserved.

The information in this presentation was prepared by JBA Risk Management Pte Ltd on 02 July 2018 for the *Workshop on Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment* and is for illustrative purposes only. Please don't use it without JBA's permission.

Copyright and acknowledgements

JBA Risk Management Ltd

JBA Risk Management Pte Ltd

Innovate UK & MIGHT

JBA risk management

THE FLOOD PEOPLE.

GLOBAL LEADERS IN FLOOD RISK MANAGEMENT.

Get in touch

hello@jbarisk.com

UK
+44 1756 799919

EUROPE
+49 8092 2326756

USA
+1 510 585 8401

SINGAPORE
+65 968 62 968

www.jbarisk.com
@jbarisk