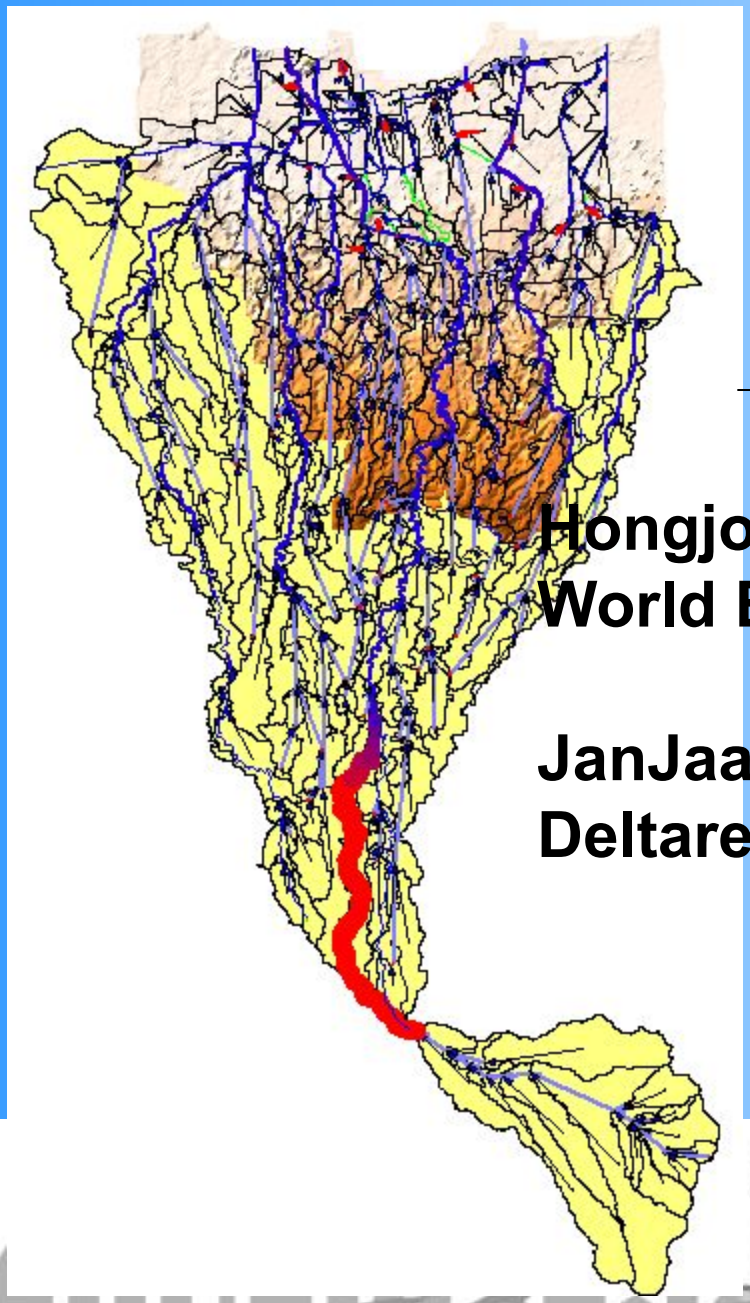

Jakarta Floods

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World Bank

JanJaap Brinkman
Deltares - Delft Hydraulics

FLOOD RISK REDUCTION
Communication Strategies
Flood Hazard Mapping
Community Participation

The World Bank

Jakarta flood management

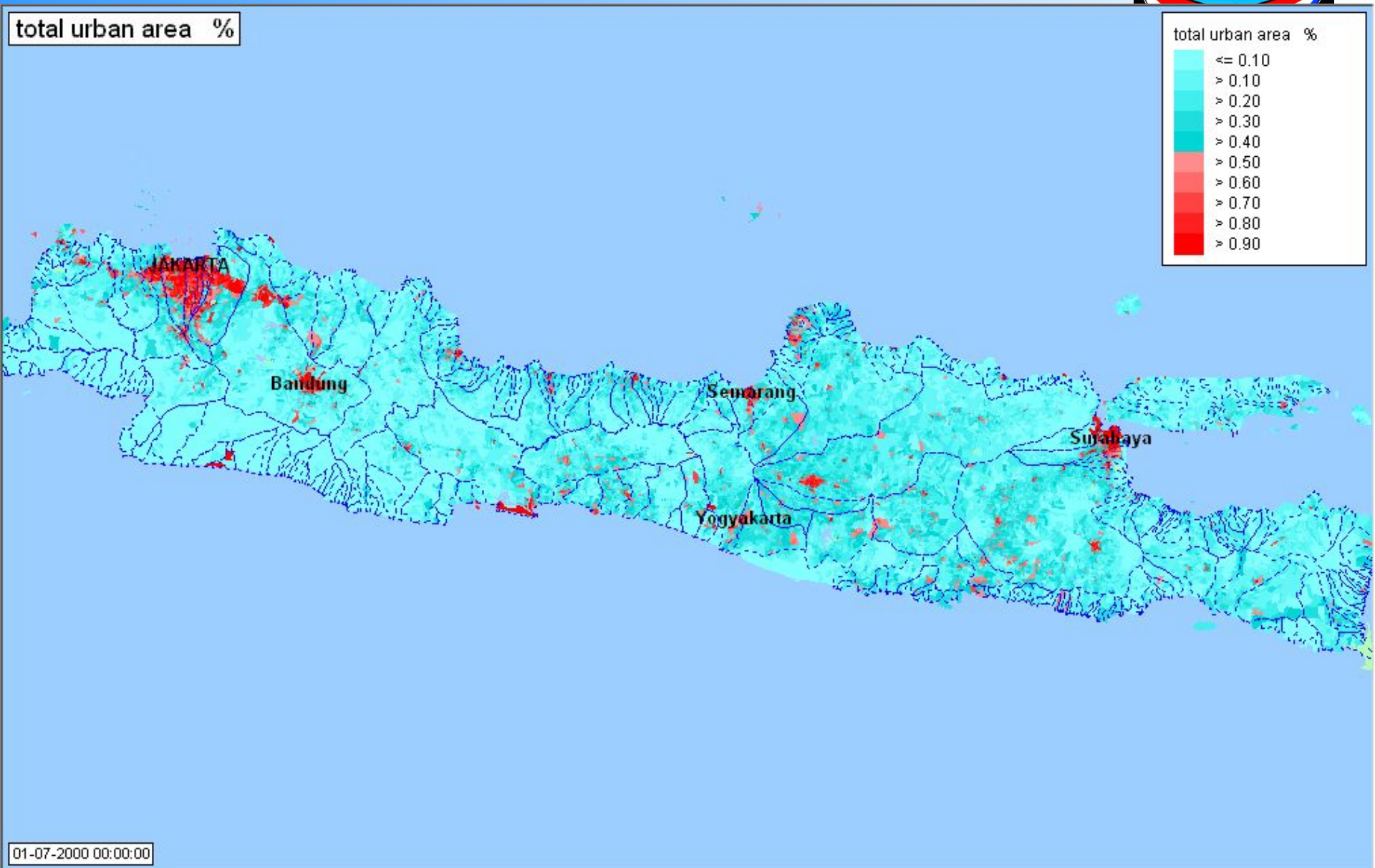
- Part 1: The basics - Spatial Planning
- Part 2: The flood of February 2007
- Part 3: No-regret measures
- Part 4: Tide and High tide floods
- Part 5: Water specialist center, short-term actions
- Part 6: Actions and financing structure

Part 1

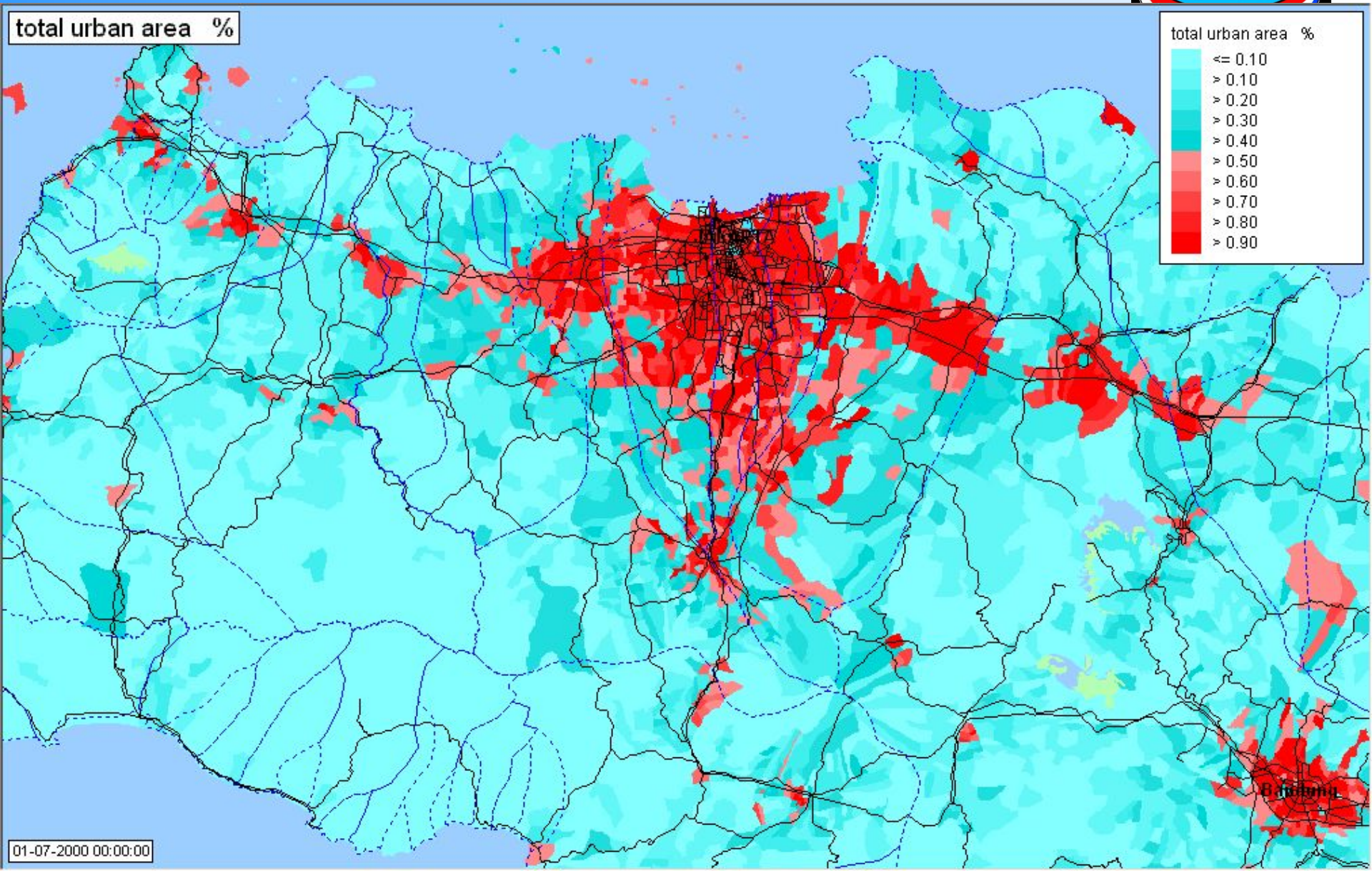
The basics: Spatial planning

“We live in a changing world”

Total urban area % (java-bali spatial plan) 2000 - 2025

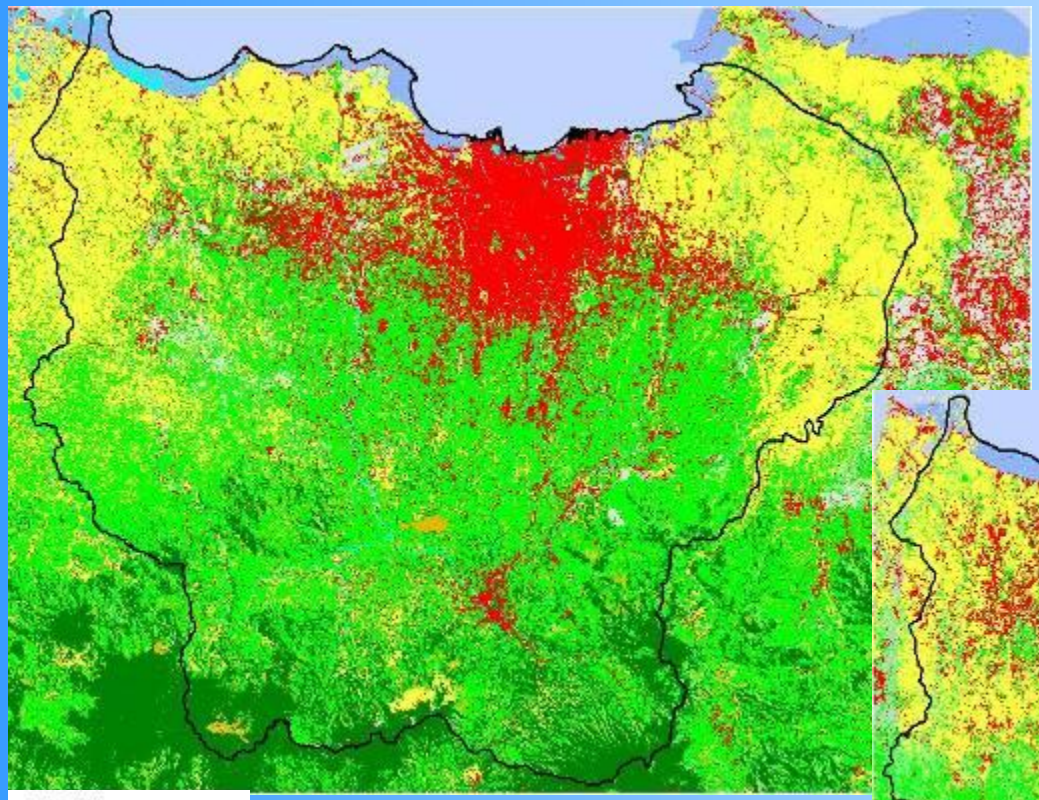


Total urban area % **(java-bali spatial plan)** 2000 - 2025

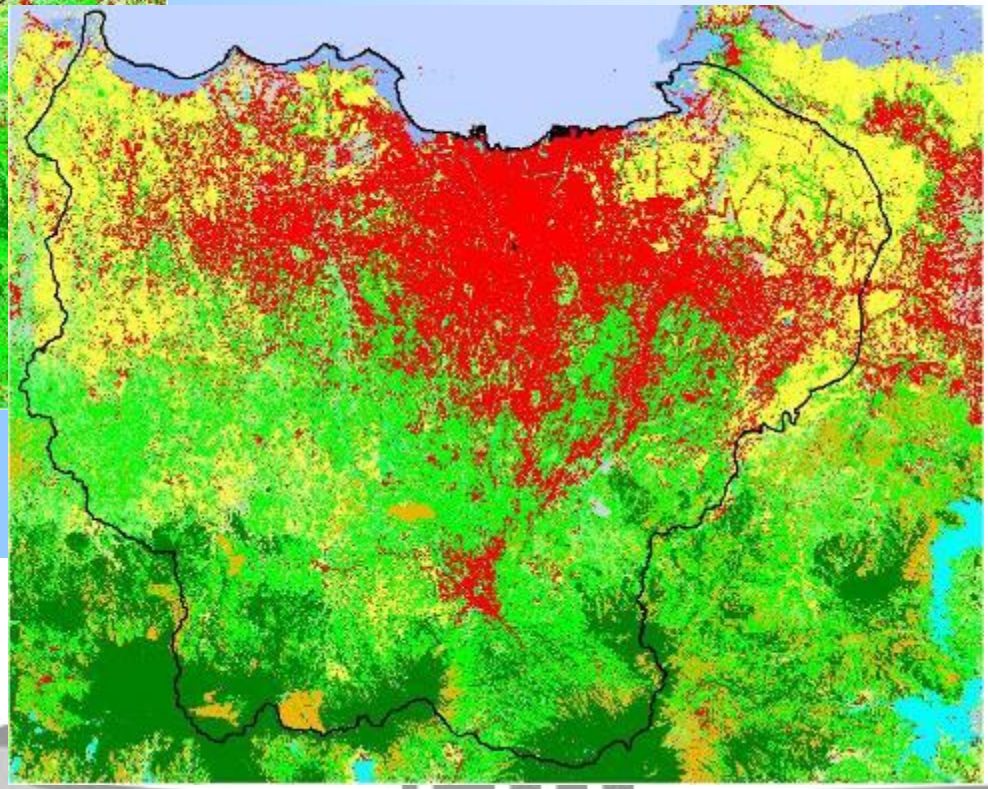


It is really happening
Landuse, Jabodetabek

1992

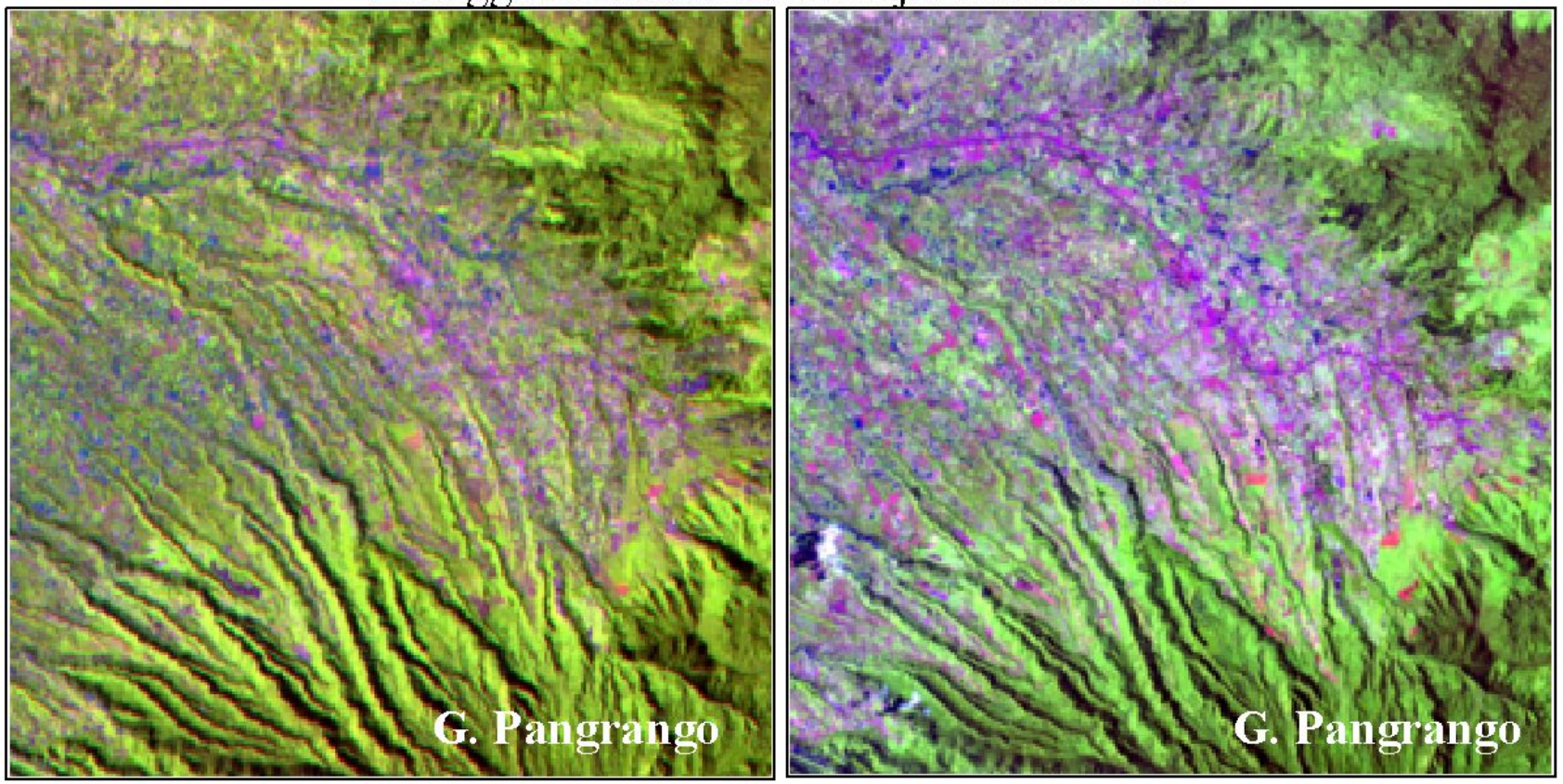


2002



It is really happening
Urban area, G. Pangrango
1992 - 2001

Perubahan Penutup/Penggunaan Lahan di Daerah Puncak dan sekitarnya
Menggunakan Data Inderaja Landsat-TM



30-07-1992

U

17-09-2001

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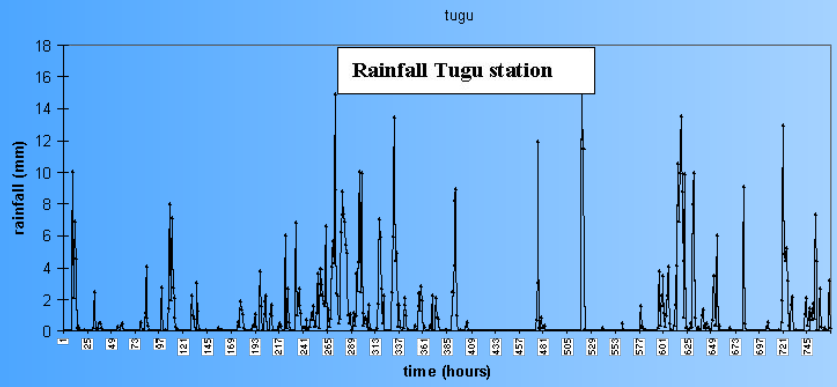
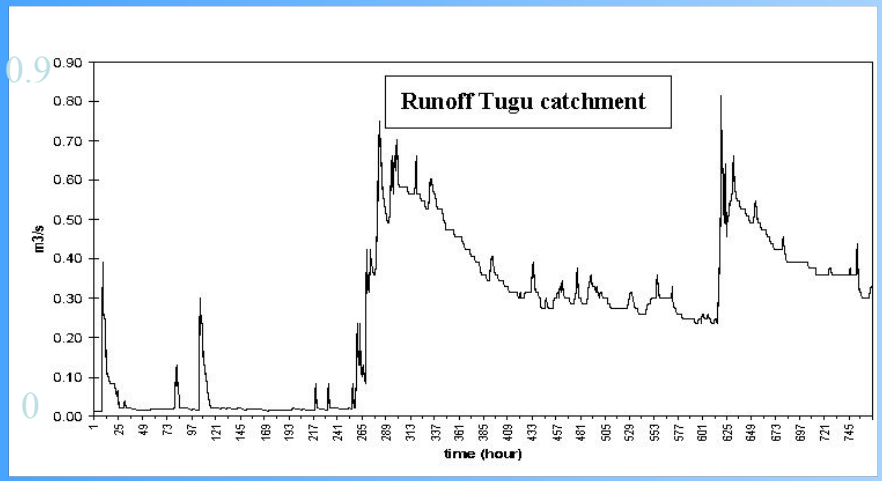
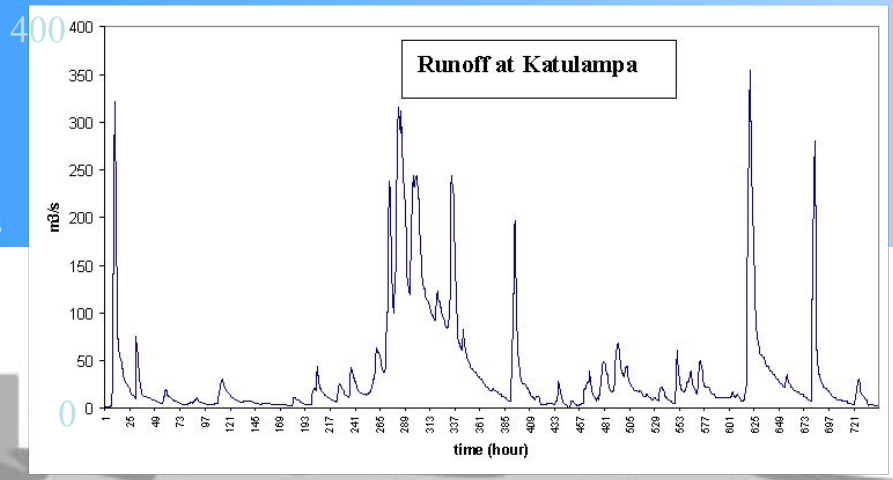


Slow runoff
Non-Urban



Land-use & Rainfall runoff (Katulampa)



Fast runoff
Urban

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Communication Strategies
Flood Hazard Mapping
Community Participation

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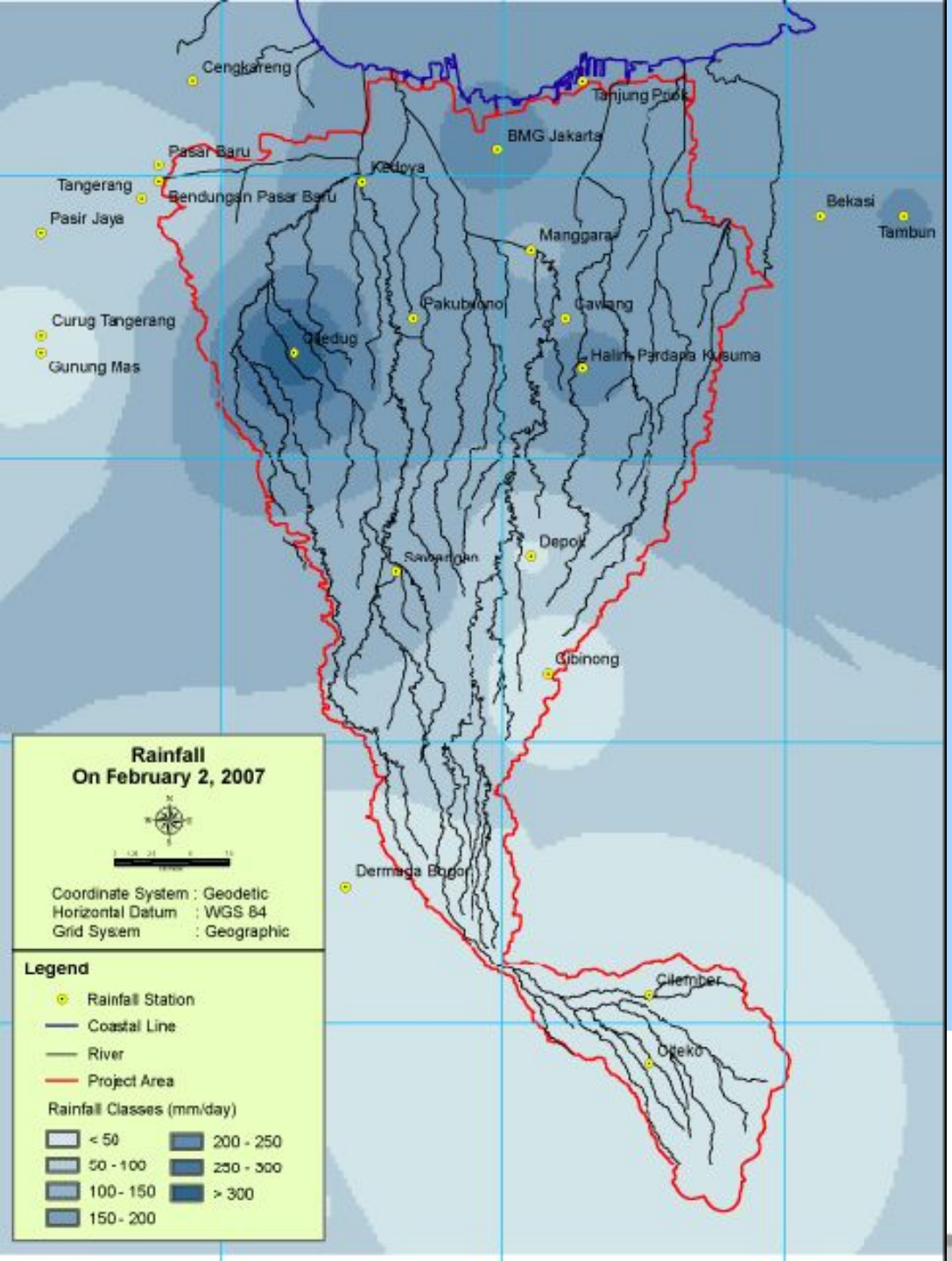
Part 2

Flood February 2007

Hydrology



Daily rainfall Feb 2

Feb 1; 07:00

–

Feb 2; 07:00

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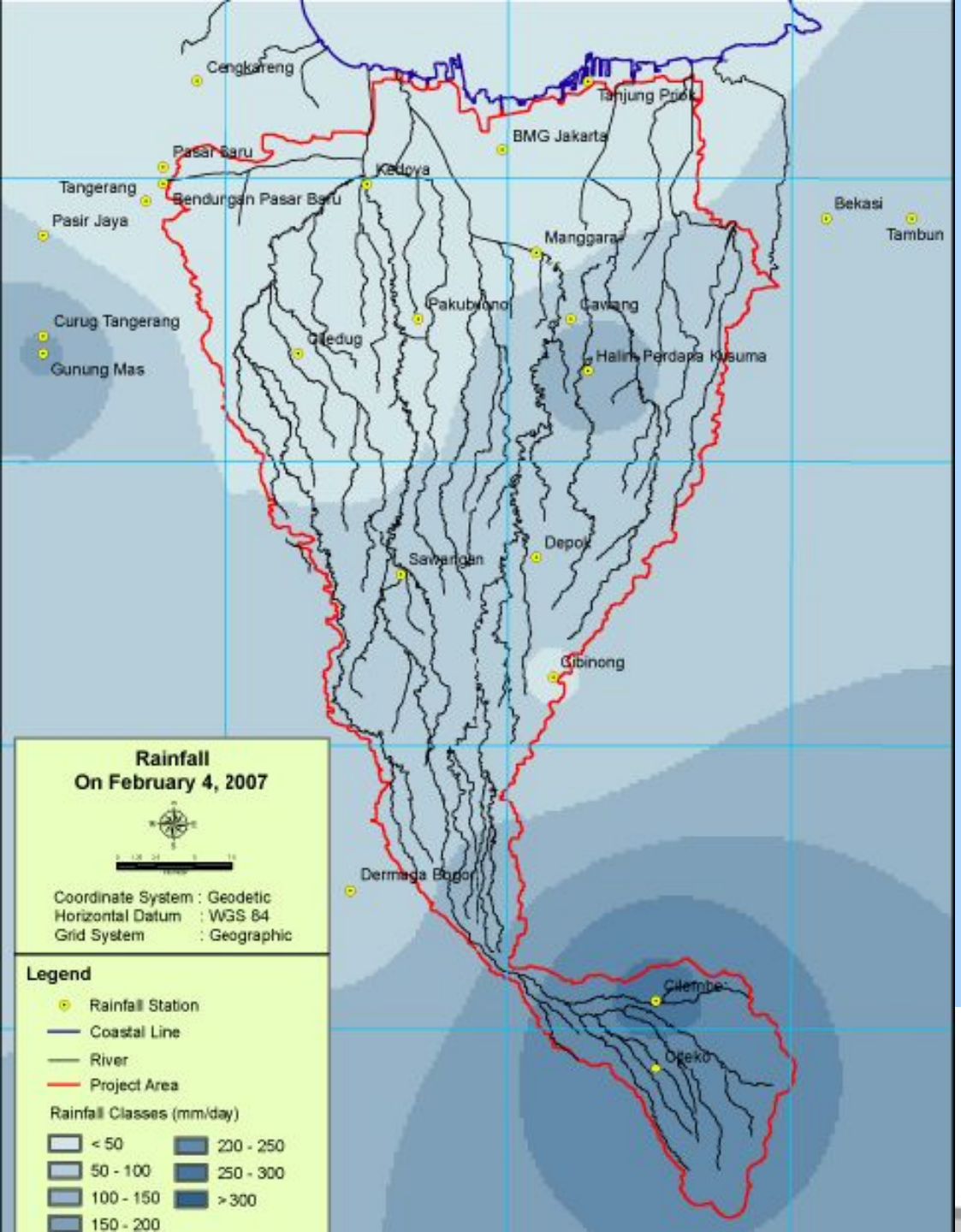

Daily rainfall Feb 4

Feb 3; 07:00

–

Feb 4; 07:00

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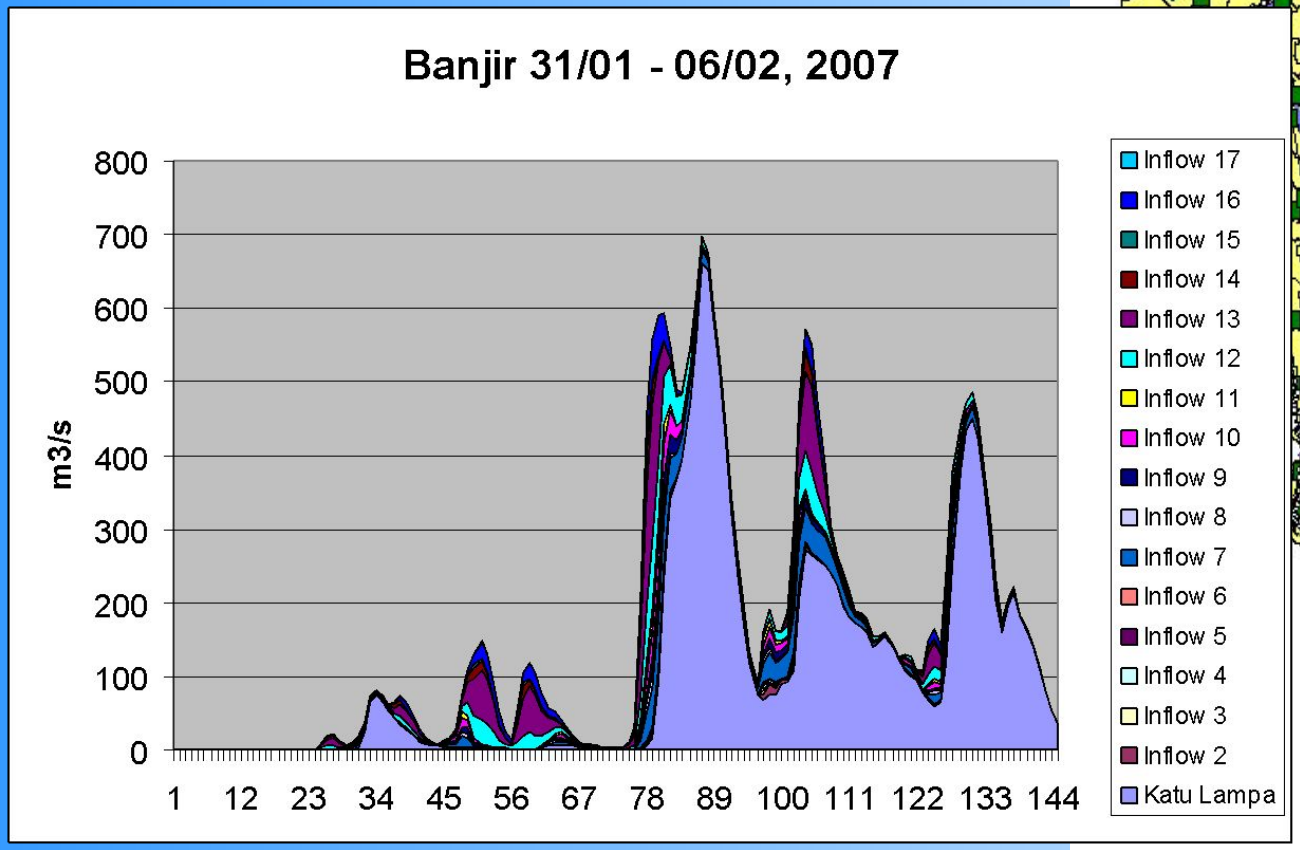
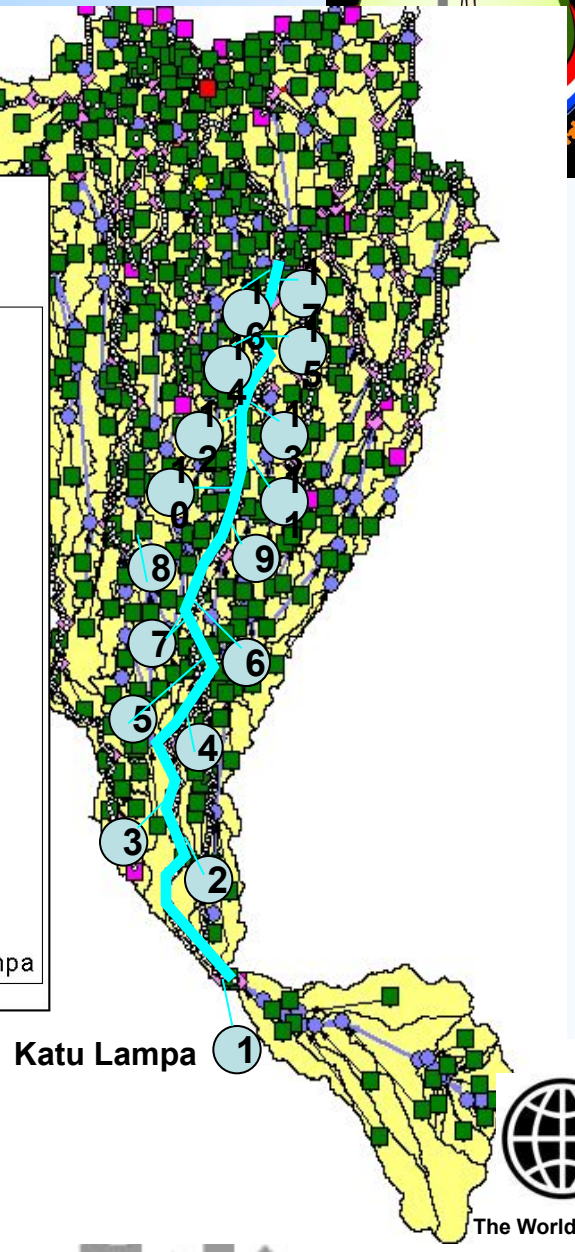
Inflow Ciliwung Febr 2007
Katu Lampa - Manggarai





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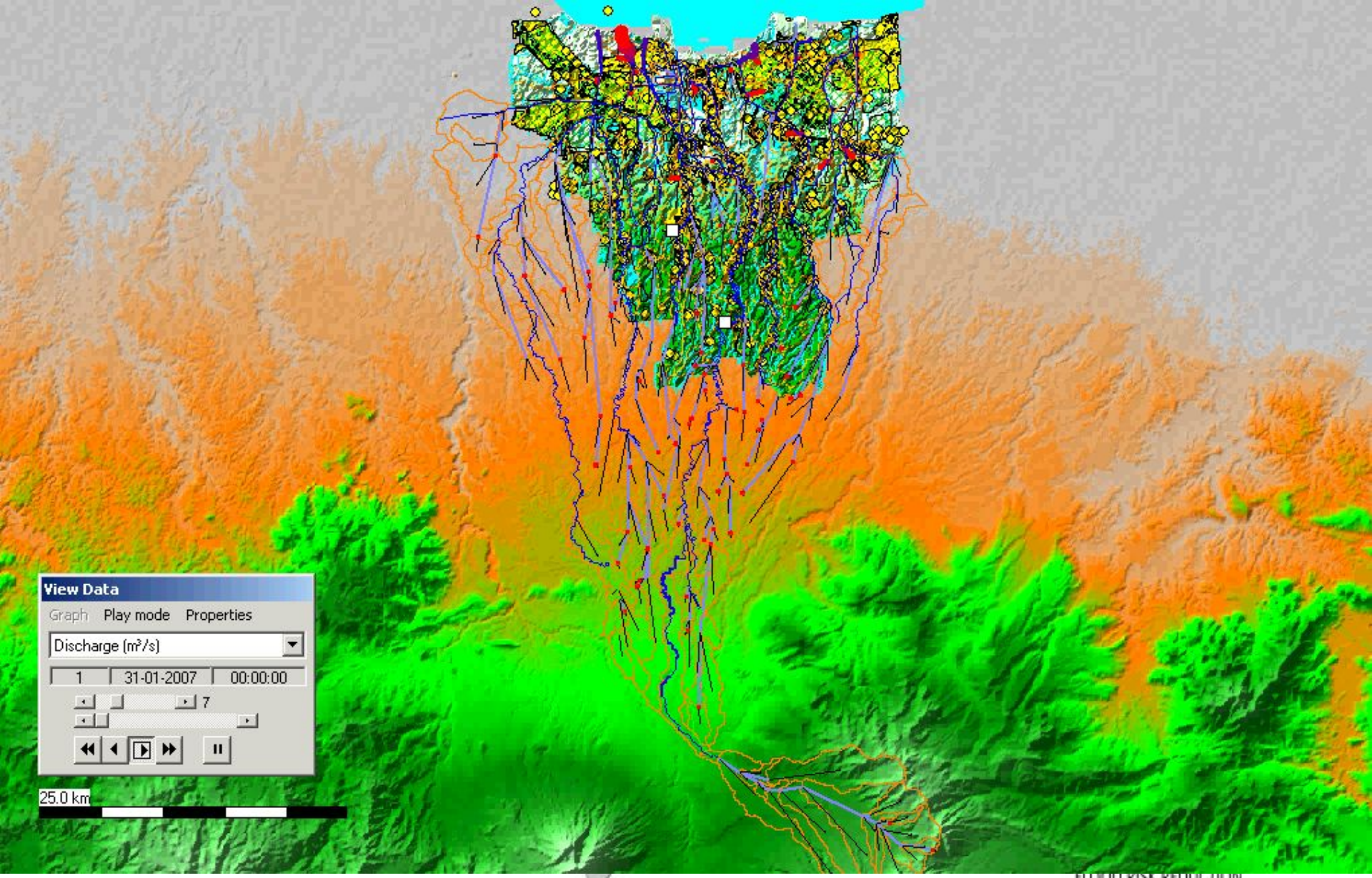
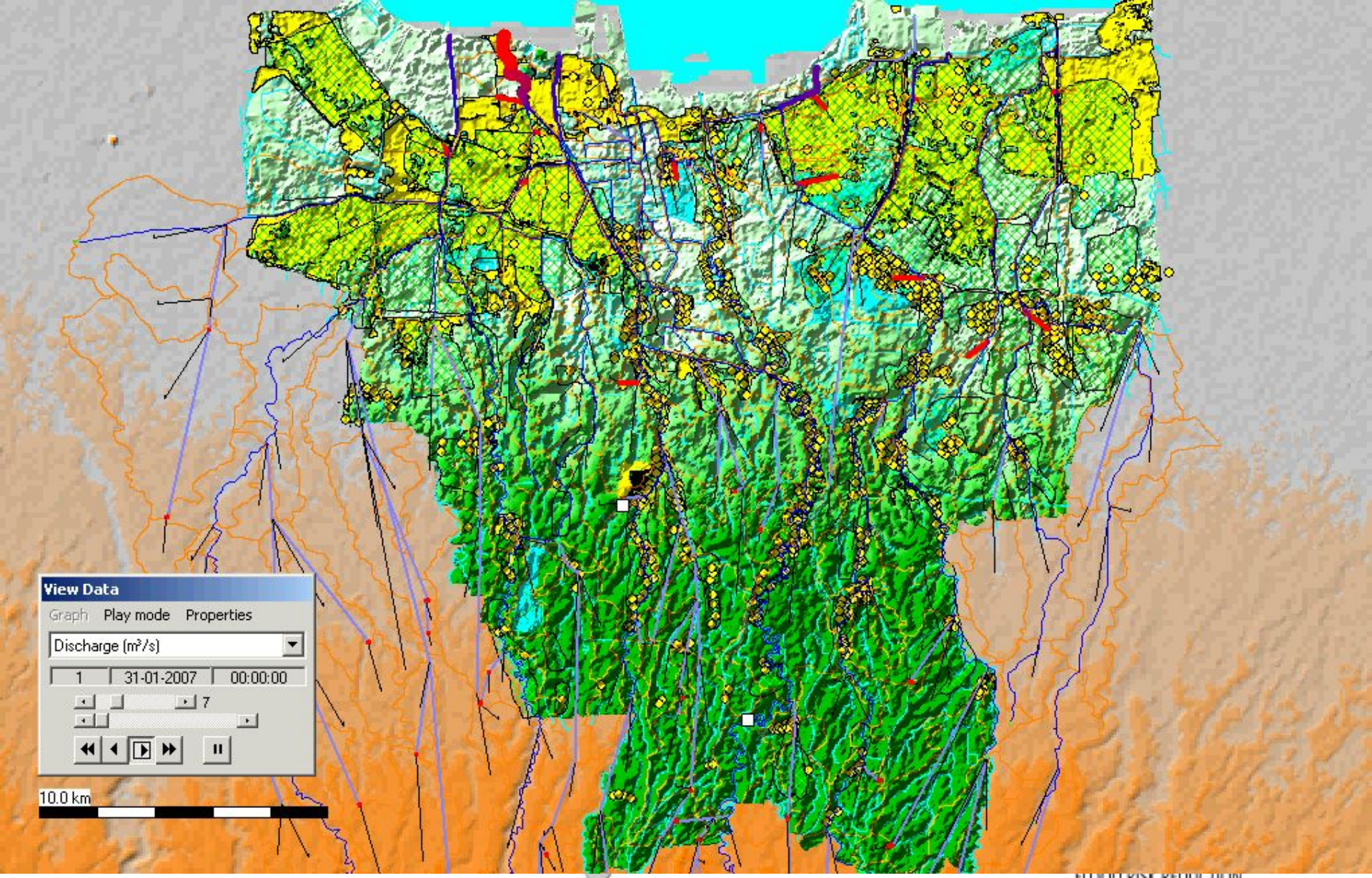
Flood February 2007

Hydraulics & Flood extent

Unique

- *"Complete upstream-downstream flood modelling framework now available for all major drainage including all 13 rivers"*


View Data
Graph
Play mode
Properties
Discharge (m³/s)
1
31-01-2007
00:00:00
7
25.0 km



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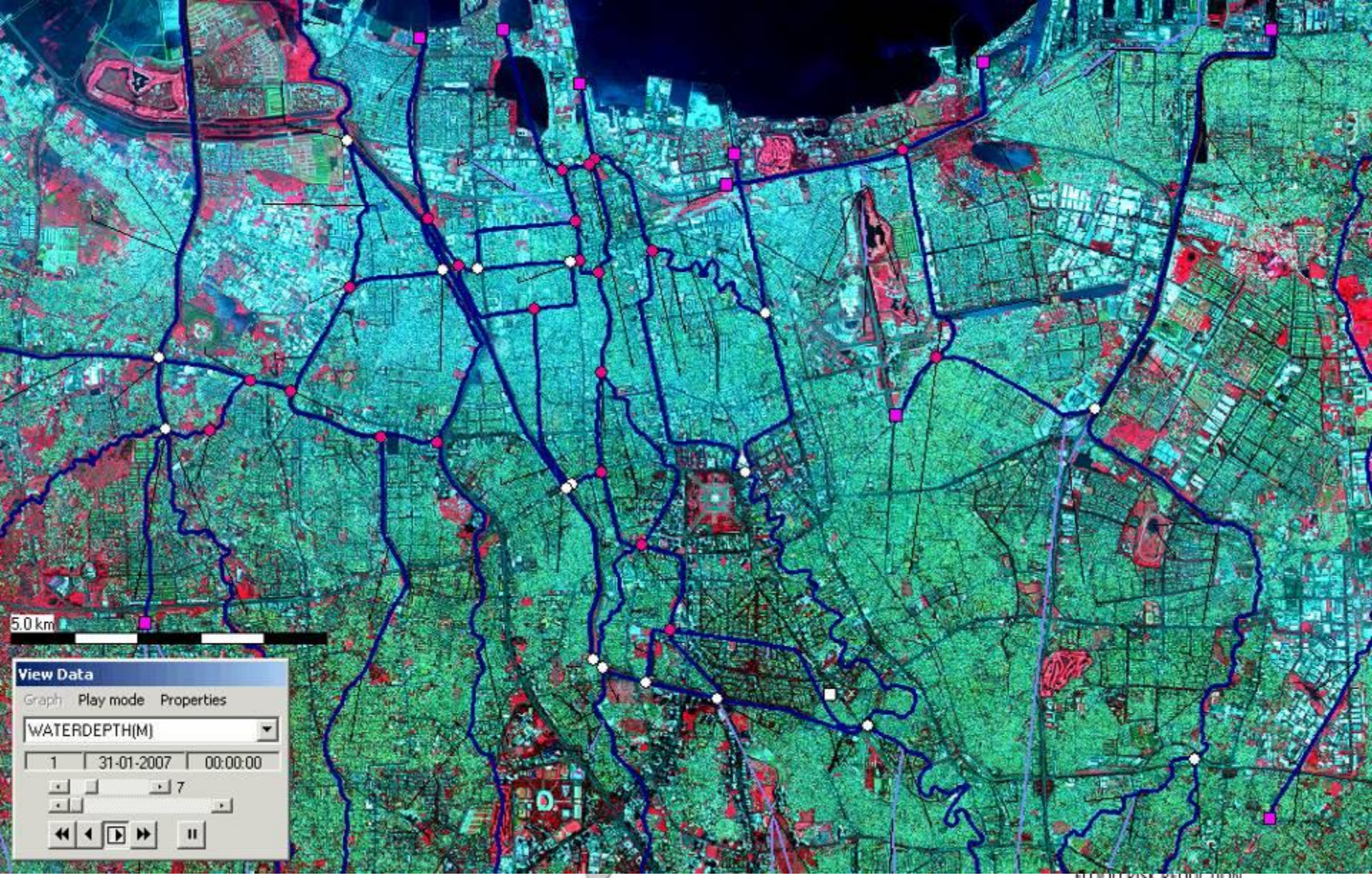

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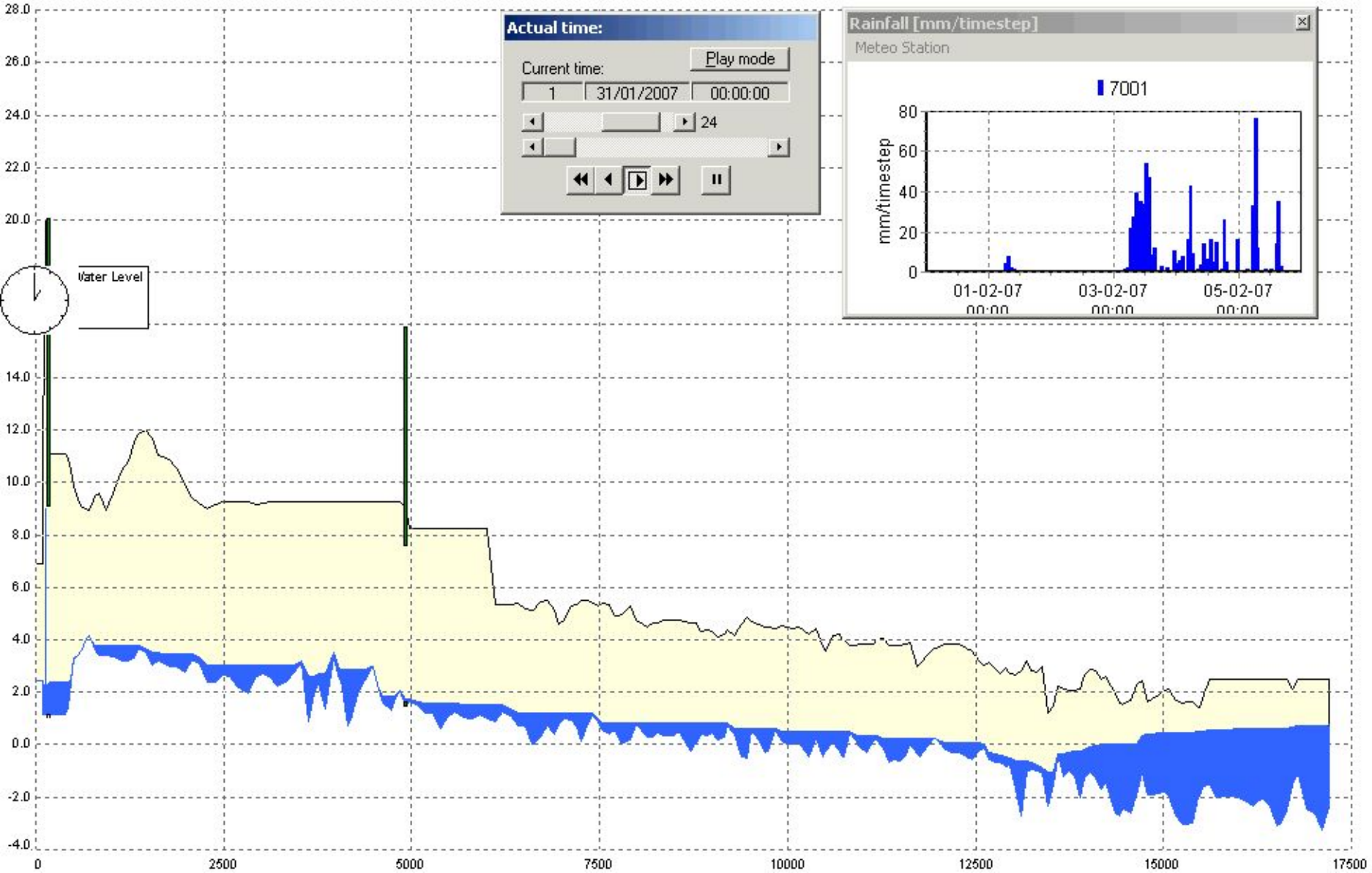
West Banjir canal



Part 3

No-regret ST Measures

Rehabilitation

"*Restore original-available design capacity*"

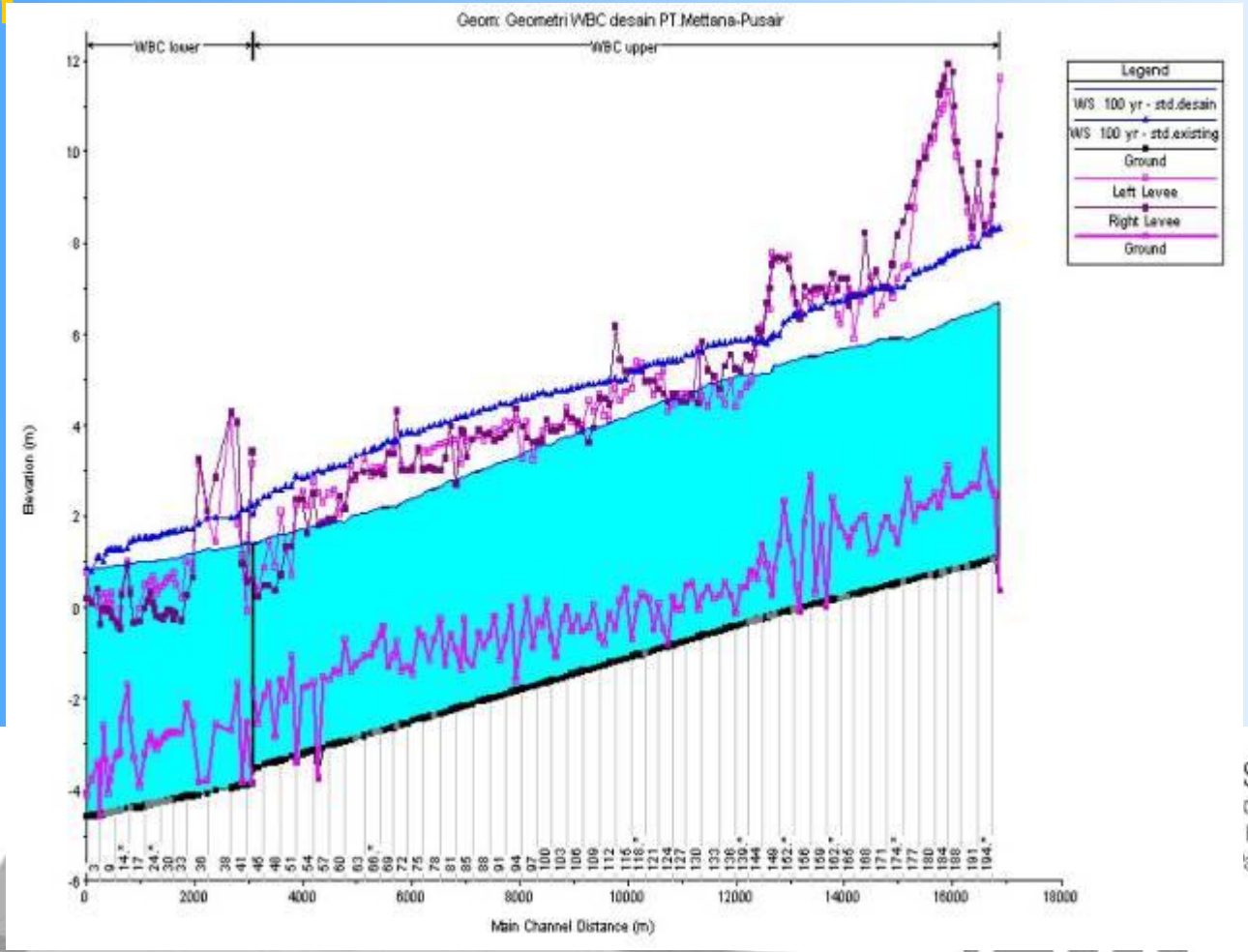
-Dredging

-Dike improvement

1. Confirmation of Scope of Works

C: River Embankment Rehabilitation

West Banjir Canal – Longitudinal Section



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on Strategies
Mapping
articipation

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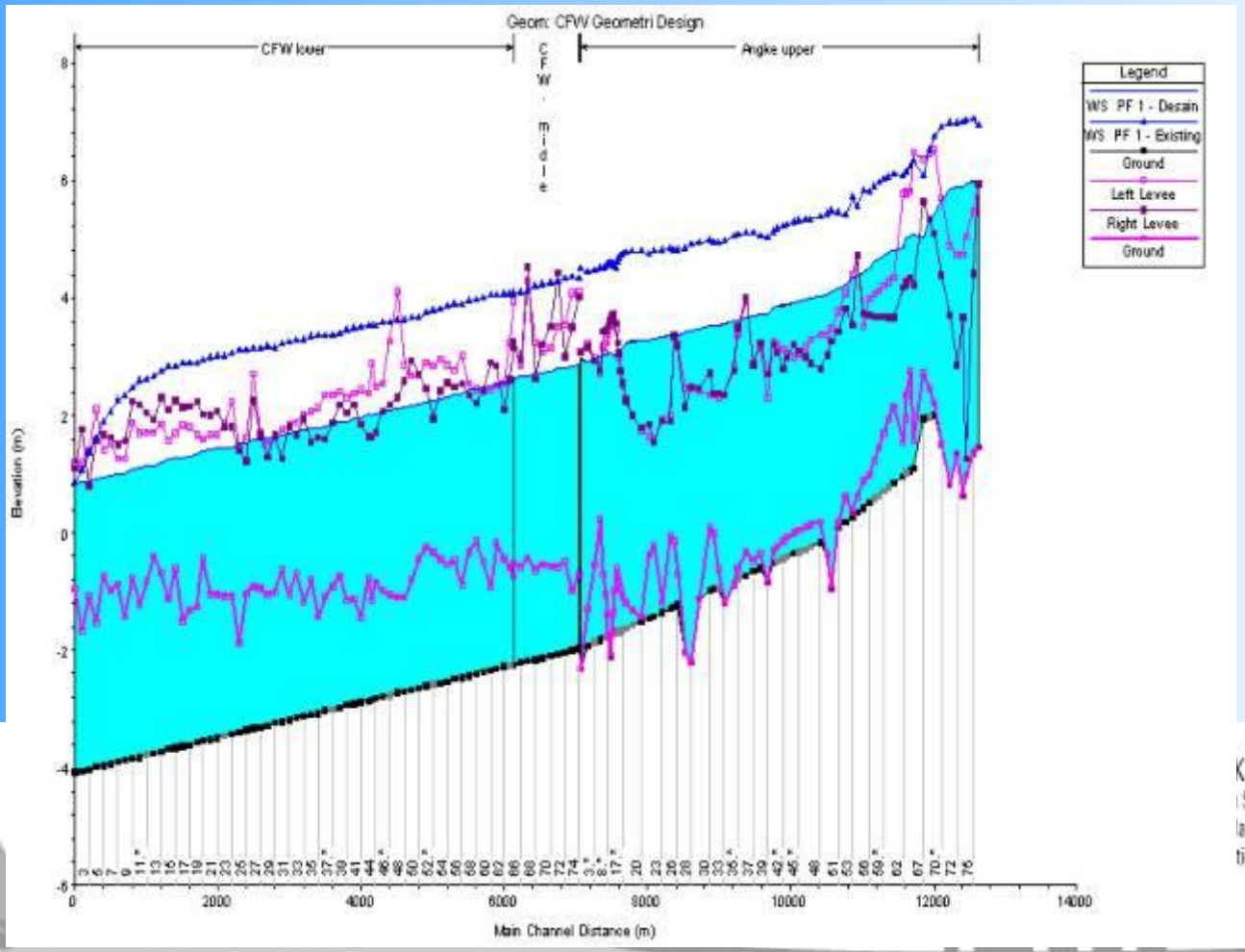
1. Confirmation of Scope of Works

C: River Embankment Rehabilitation

Cengkareng Floodway – Longitudinal Section



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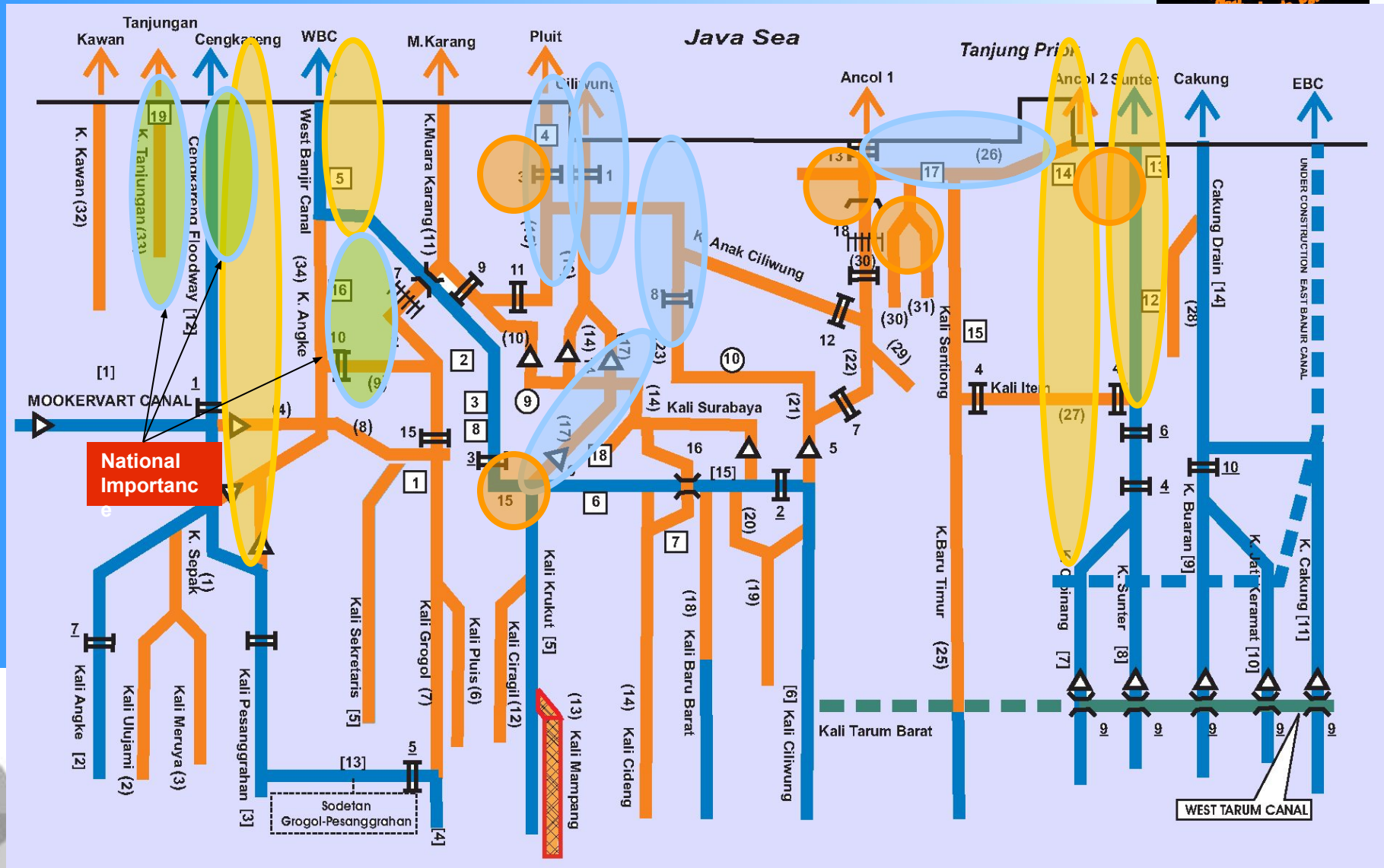
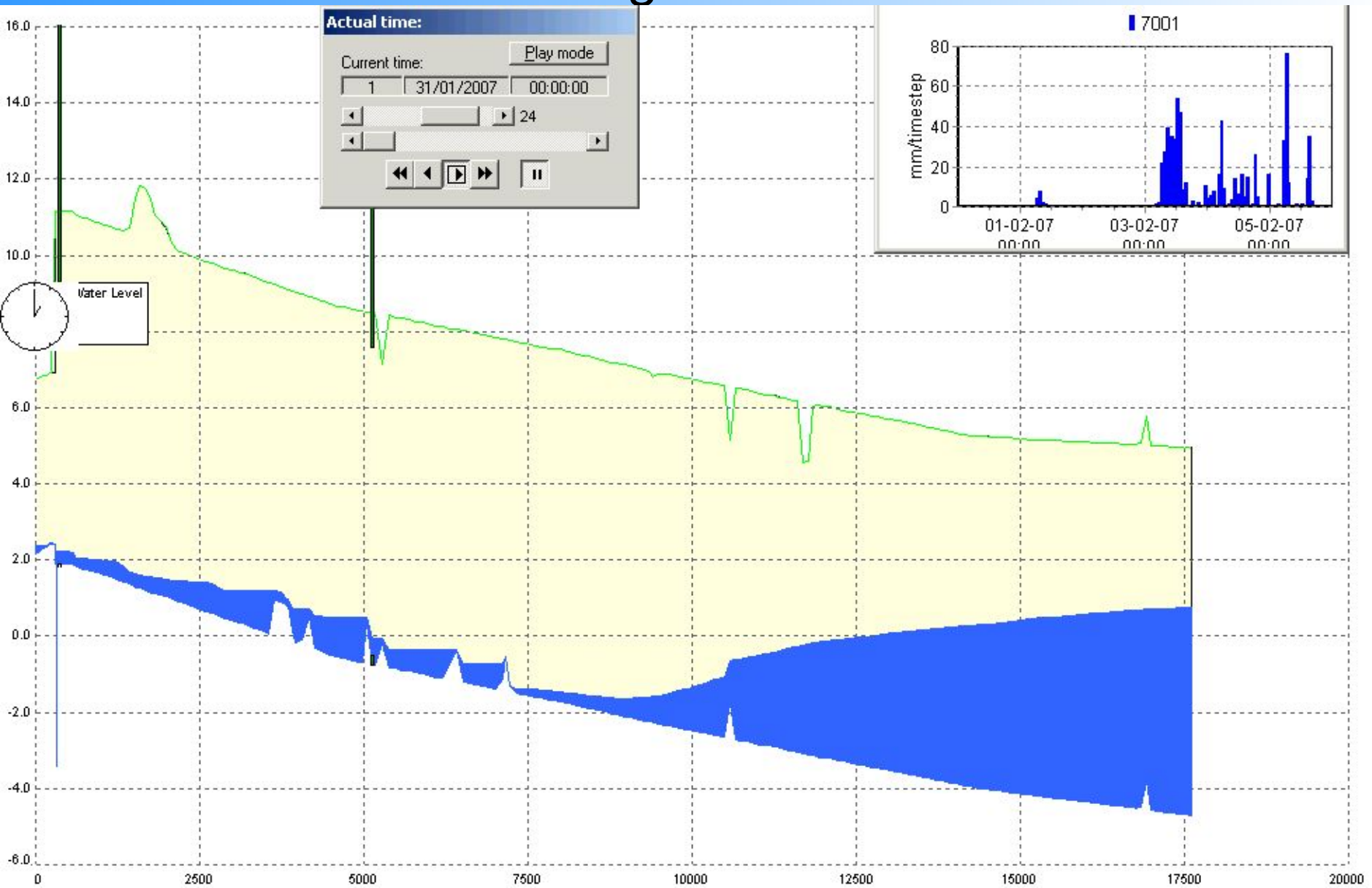
1. Scope of Works

A: Urgent Maintenance Dredging



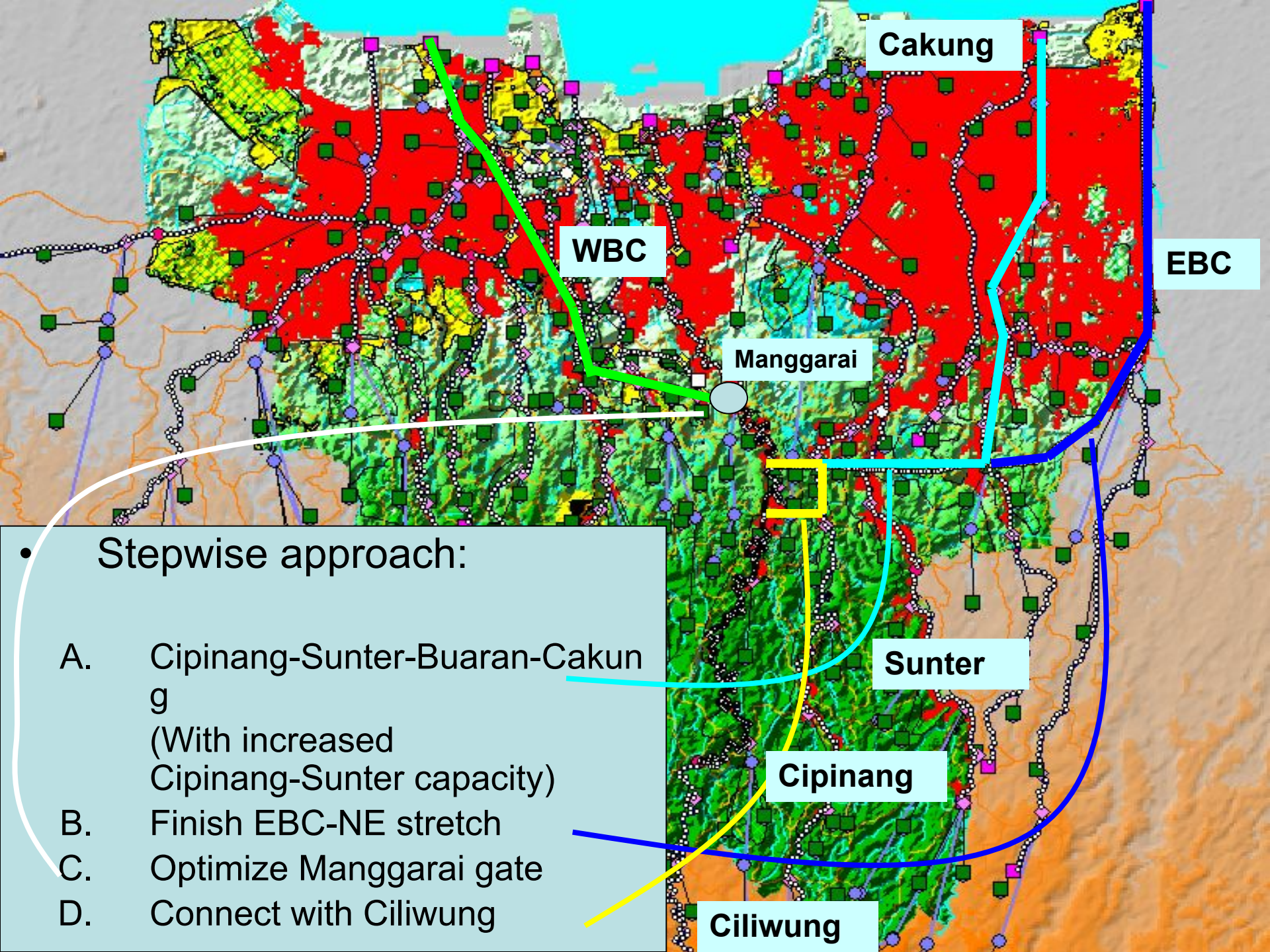
West banjir canal

design



No-regret ST Measures

"*East-Banjir Canal*"



- Stepwise approach:

A. Cipinang-Sunter-Buaran-Cakung
(With increased Cipinang-Sunter capacity)

B. Finish EBC-NE stretch

C. Optimize Manggarai gate

D. Connect with Ciliwung

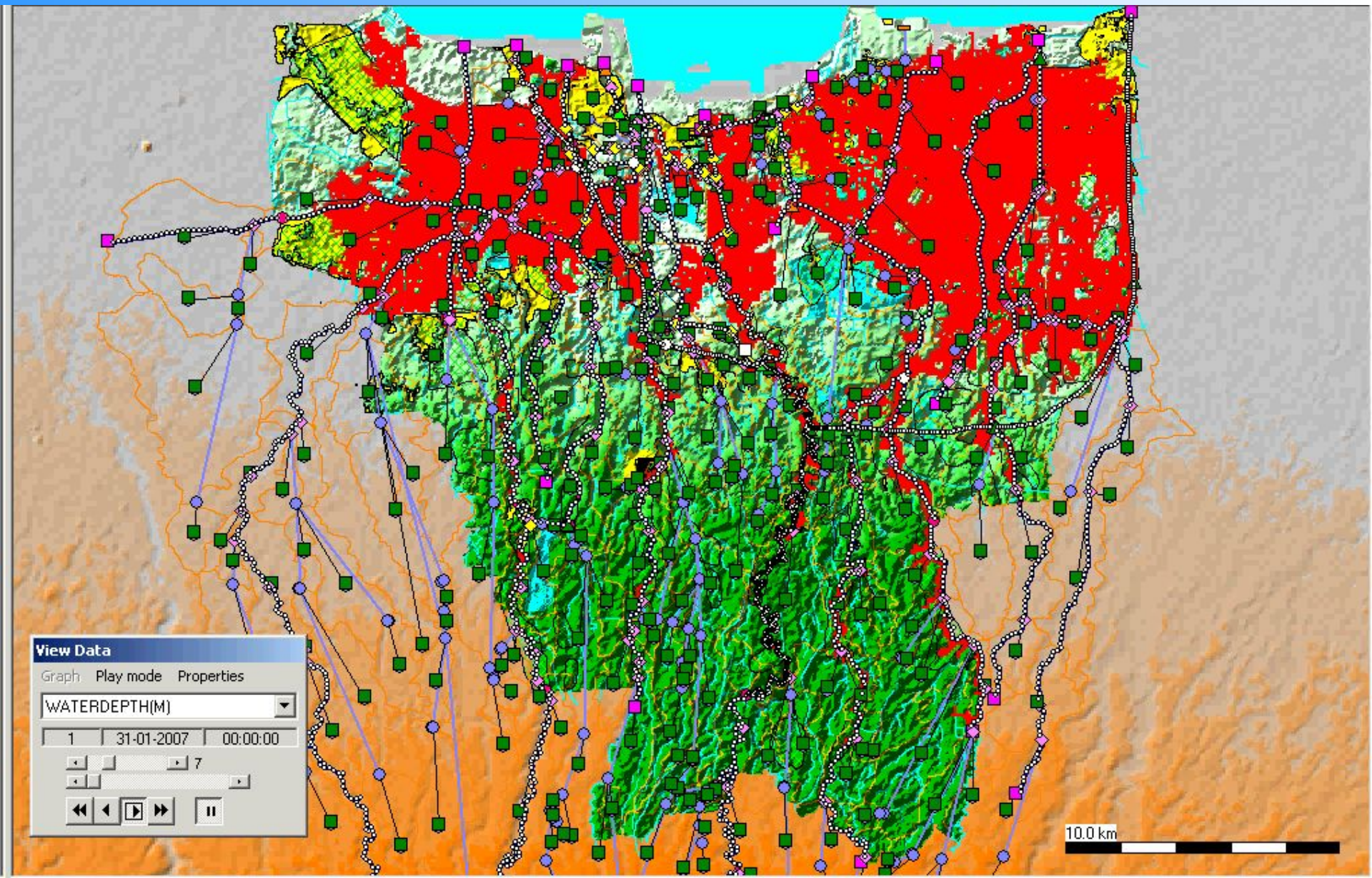

Increase capacity
CASABLANCA STREET
ALTERNATIF 2
DIVISION STRUCTURE
CONNECTION TUNNEL/CANAL
MODIVICATION OF EBC CAPACITY AND BOTTOM ELEVATION
KALIMALANG
© 2007 Europa Technologies
Image © 2007 DigitalGlobe
©2007 Google
Pointer 6°14'10.42" S 106°52'42.81" E elev 62 ft
Streaming 100%
Eye alt 13038 ft


Increase capacity
CASABLANCA STREET
ALTERNATIF I
MODIFICATION OF EBC CAPACITY
AND BOTTOM ELEVATION
ENLARGEMENT
CIPINANG RIVER
KALI MALANG
DIVISION
STRUCTURE
CONNECTION
TUNNEL/CANAL
© 2007 Europa Technologies
Image © 2007 DigitalGlobe
©2007 Google
Pointer 6°14'10.42" S 106°52'42.81" E elev 62 ft
Streaming 100%
Eye alt 13038 ft

No-regret ST Measures

EBC-CAK-CIL-Manggarai Simulation 2007

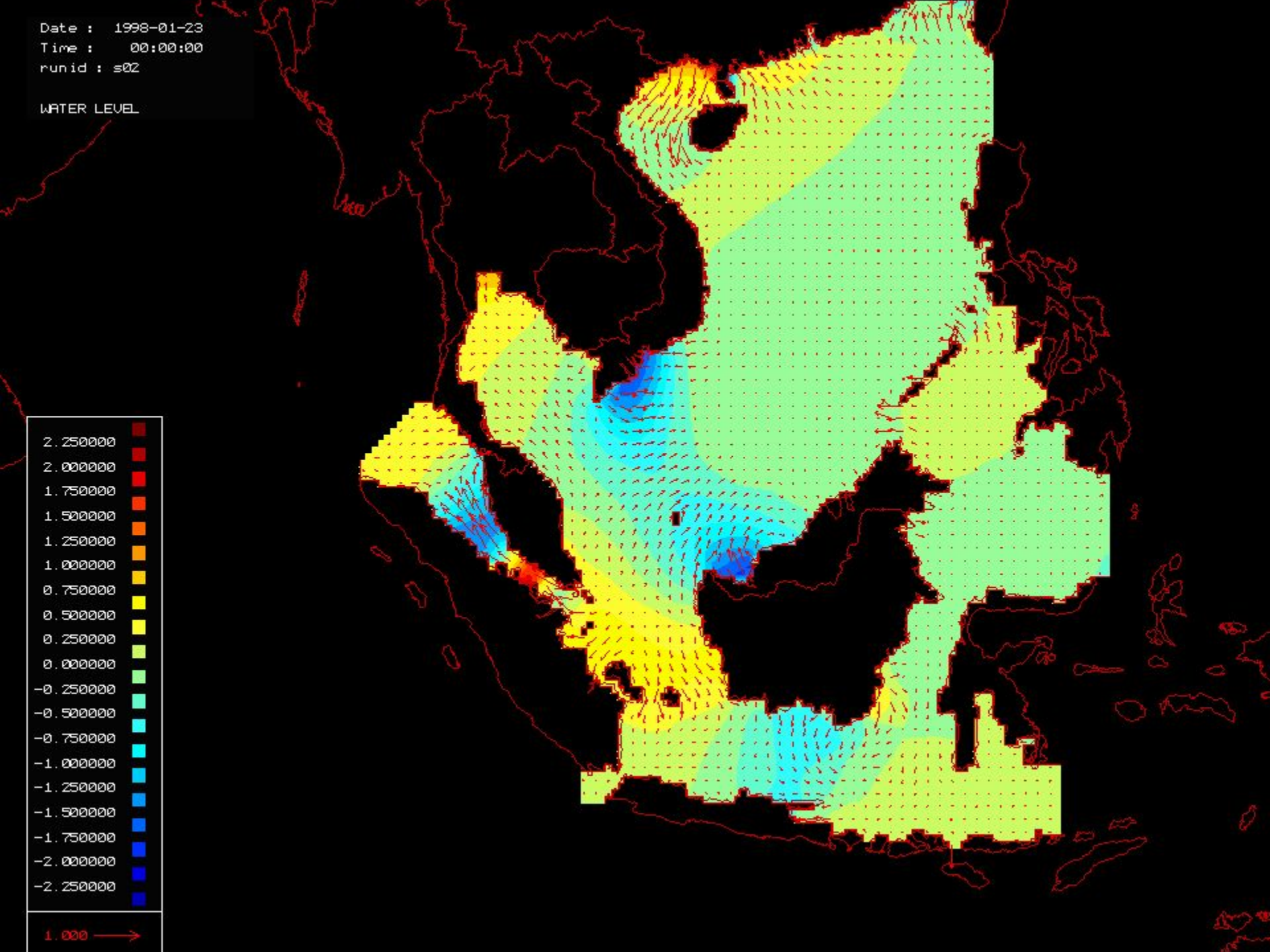
EBC-CAK-CIL-Manggarai




10.0 km

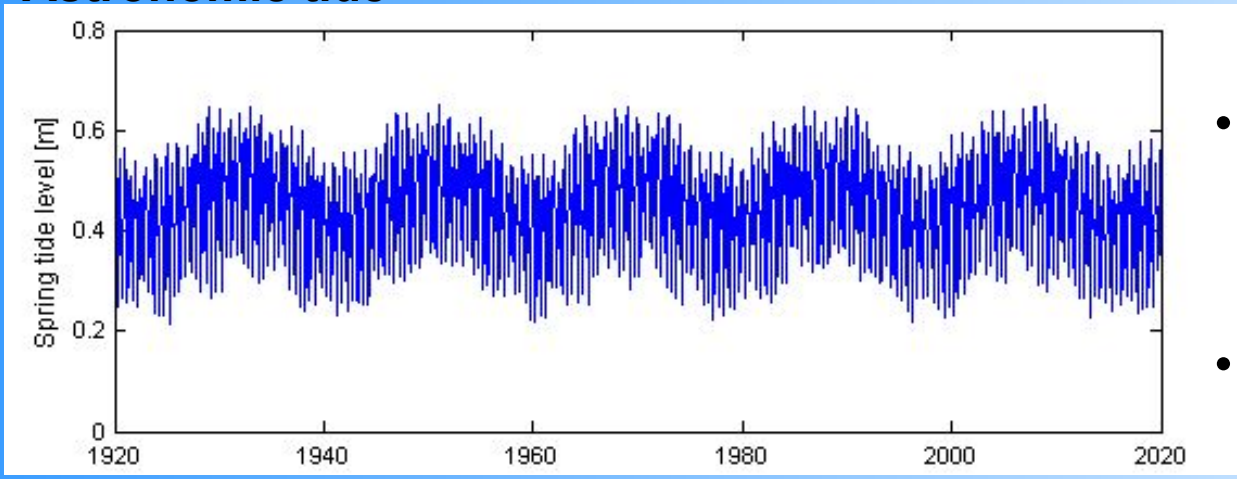
Part 4

Tidal analysis
High Tide floods

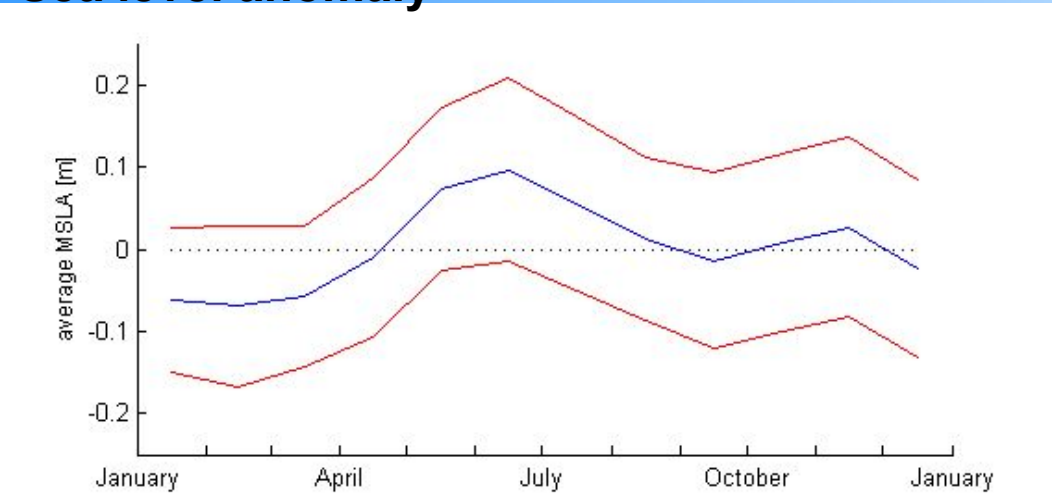

Date : 1998-01-23
Time : 00:00:00
runid : s02
WATER LEVEL
2.250000
2.000000
1.750000
1.500000
1.250000
1.000000
0.750000
0.500000
0.250000
0.000000
-0.250000
-0.500000
-0.750000
-1.000000
-1.250000
-1.500000
-1.750000
-2.000000
-2.250000
1.000

Spring tide analysis

Astronomic tide



Sea level anomaly

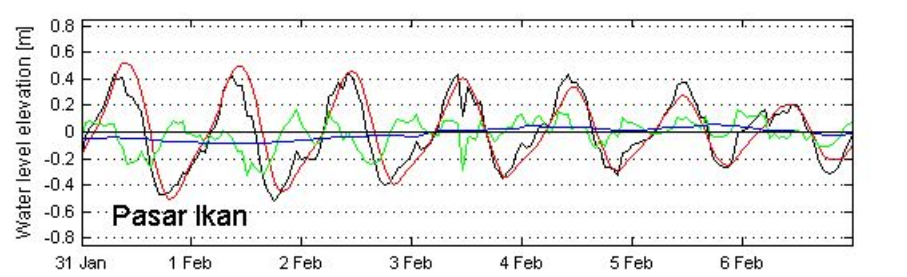


- Prediction based on analysed tidal constituents Tanjung Priok
- Only spring tides are plotted
- Upper plot: 18.6 year cycle caused by eliptical orbit moon
- Lower plot: semi-annual cycle presumably caused by interaction diurnal and semi-diurnal spring-neap cycle

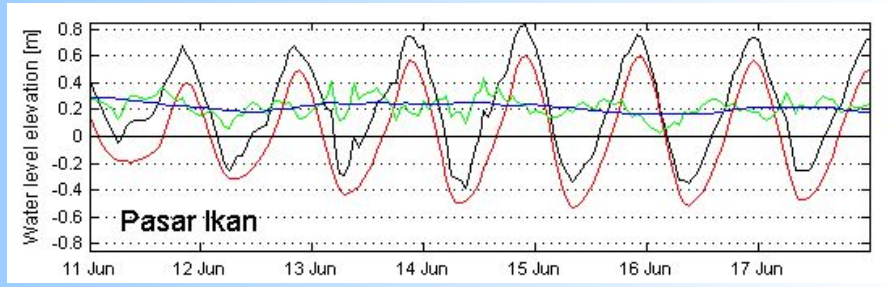
FLOOD RISK REDUCTION
Flood Hazard Mapping
Community Participation

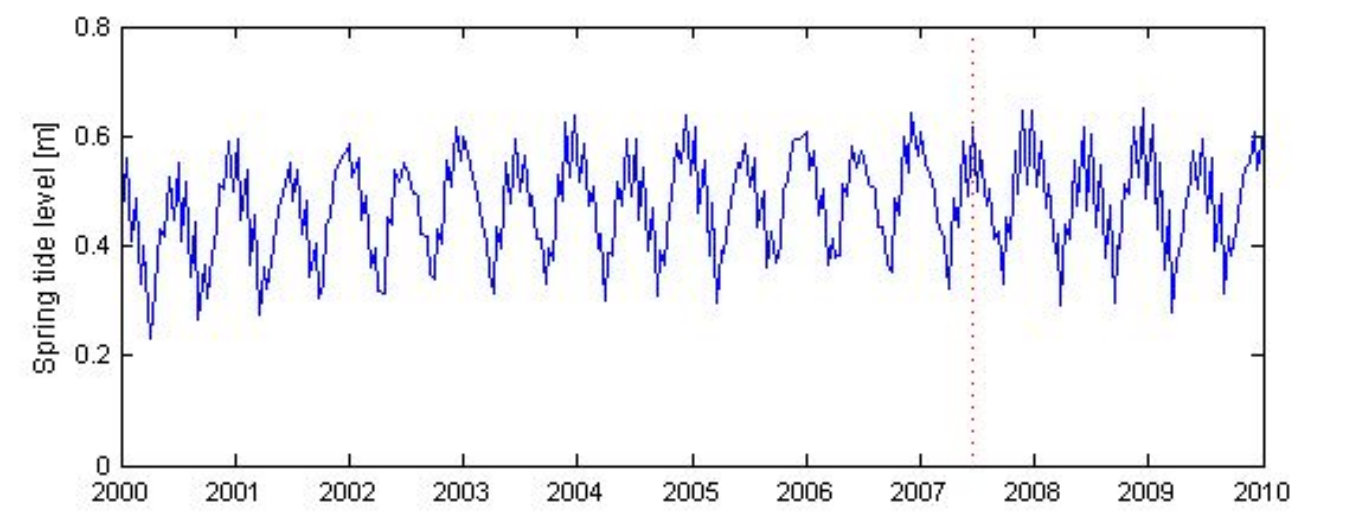
Flood event June 2007

February 2007, not exceptional



flooding reported at June 14, ~10.00 pm





- Increase in water level due to MSLA
- Spring tide (at semi-annual high)

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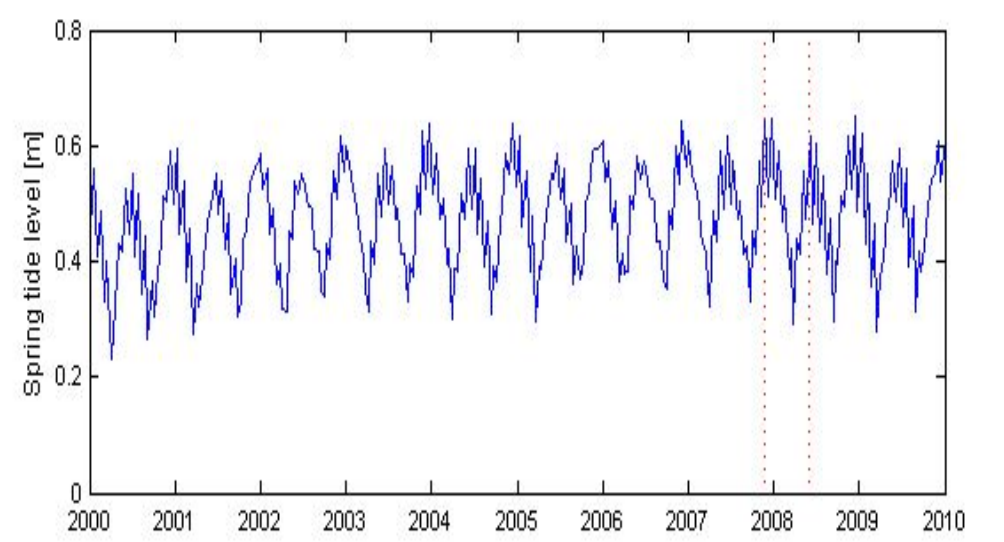
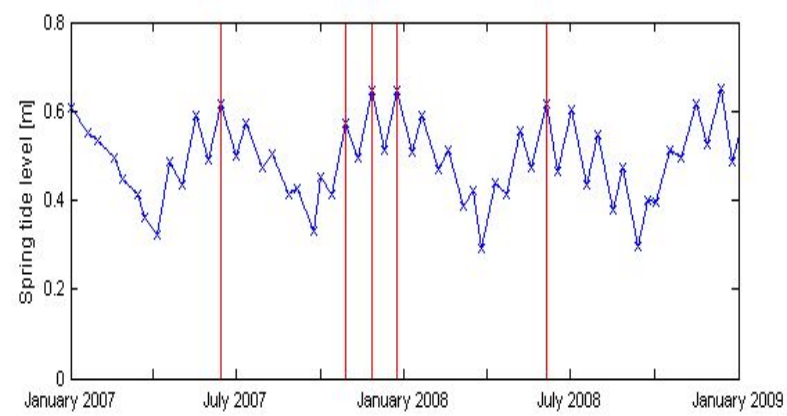
Future high spring tides





Next semi-annual high spring tide:

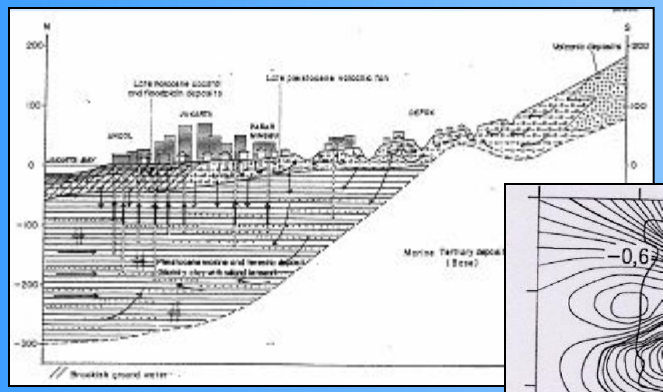
October 29, November 26, December 24 -2007, January 21

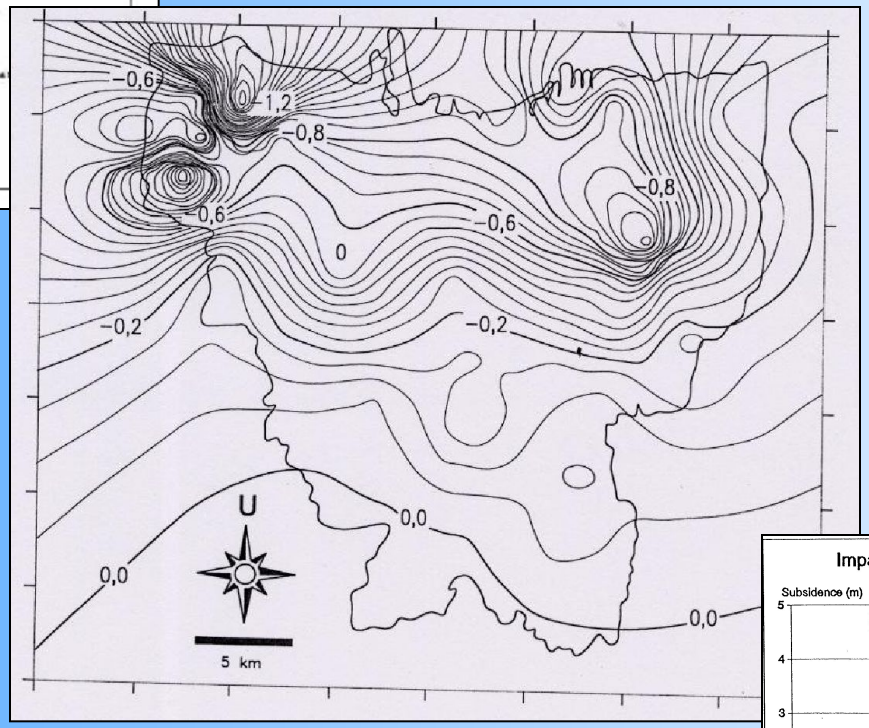
Following semi-annual high spring tide: June 4, 2008

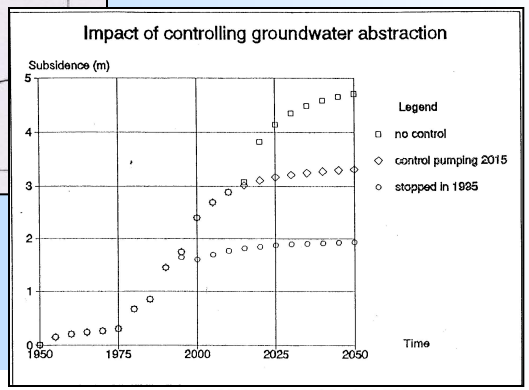
- Month with the highest average MSLA!

November 26, 2007

Subsidence







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Land-use change

1980

2003

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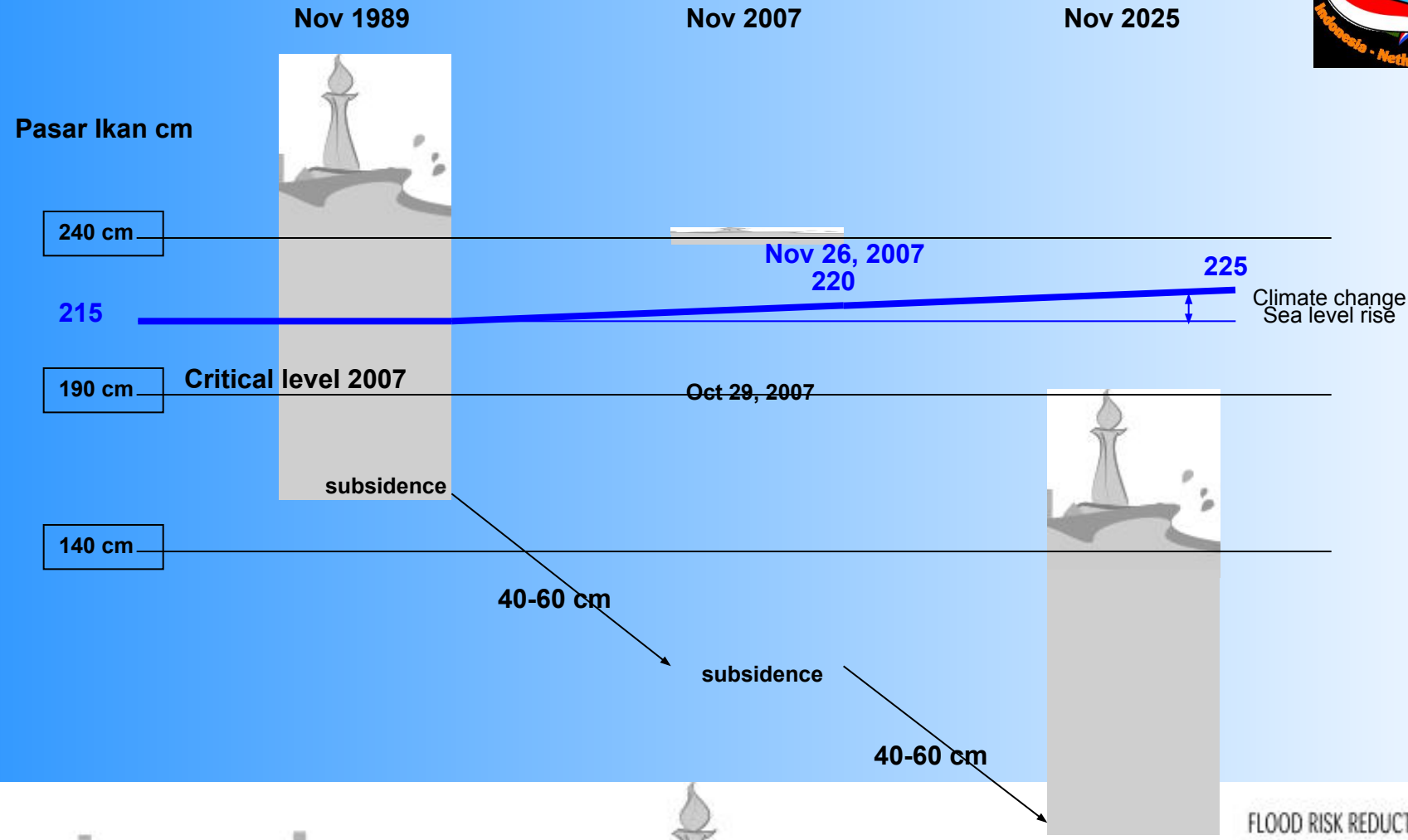
Pluit 1989, 2007, 2025

(Positive view)



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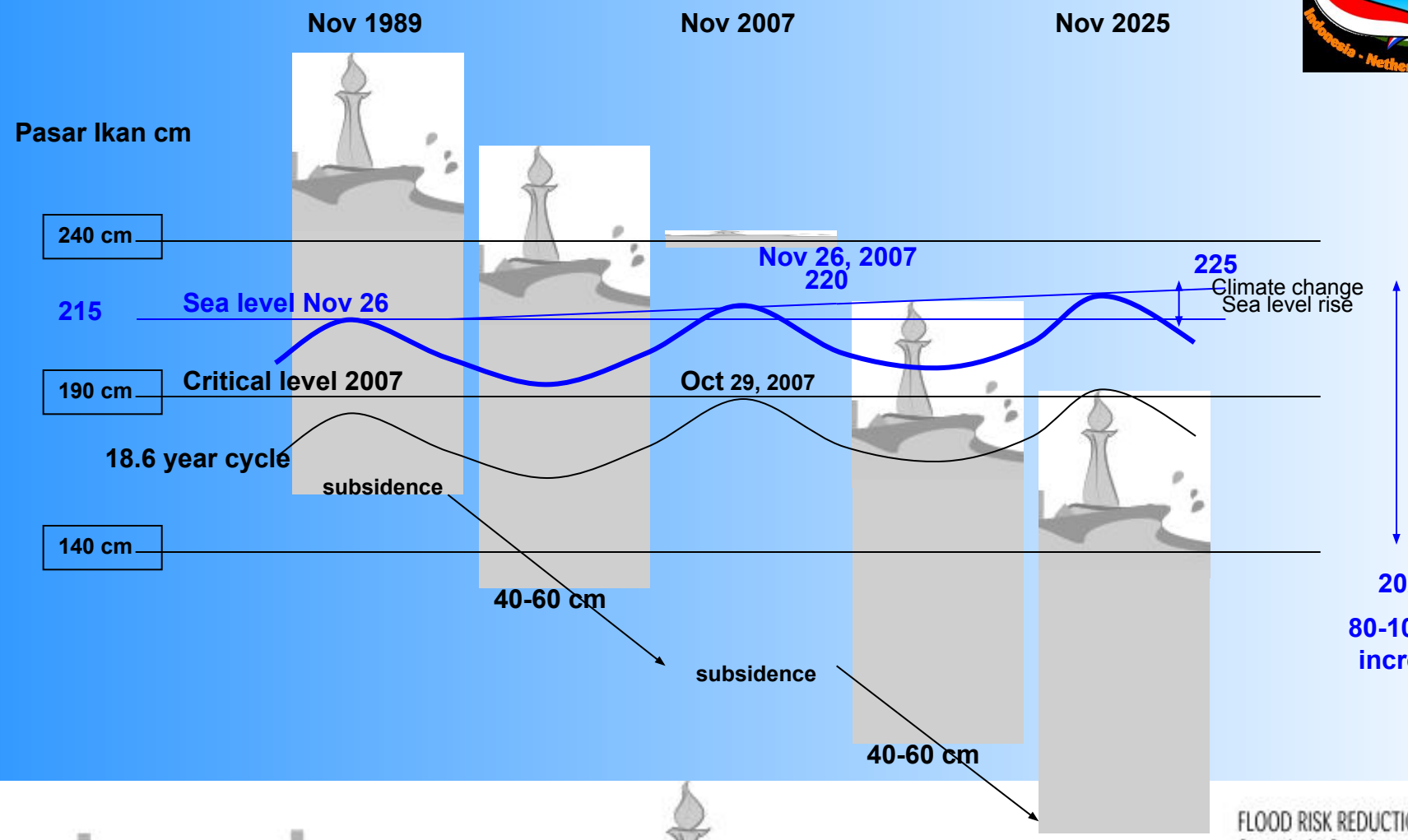
Pluit 1989, 2007, 2025

(Positive view)



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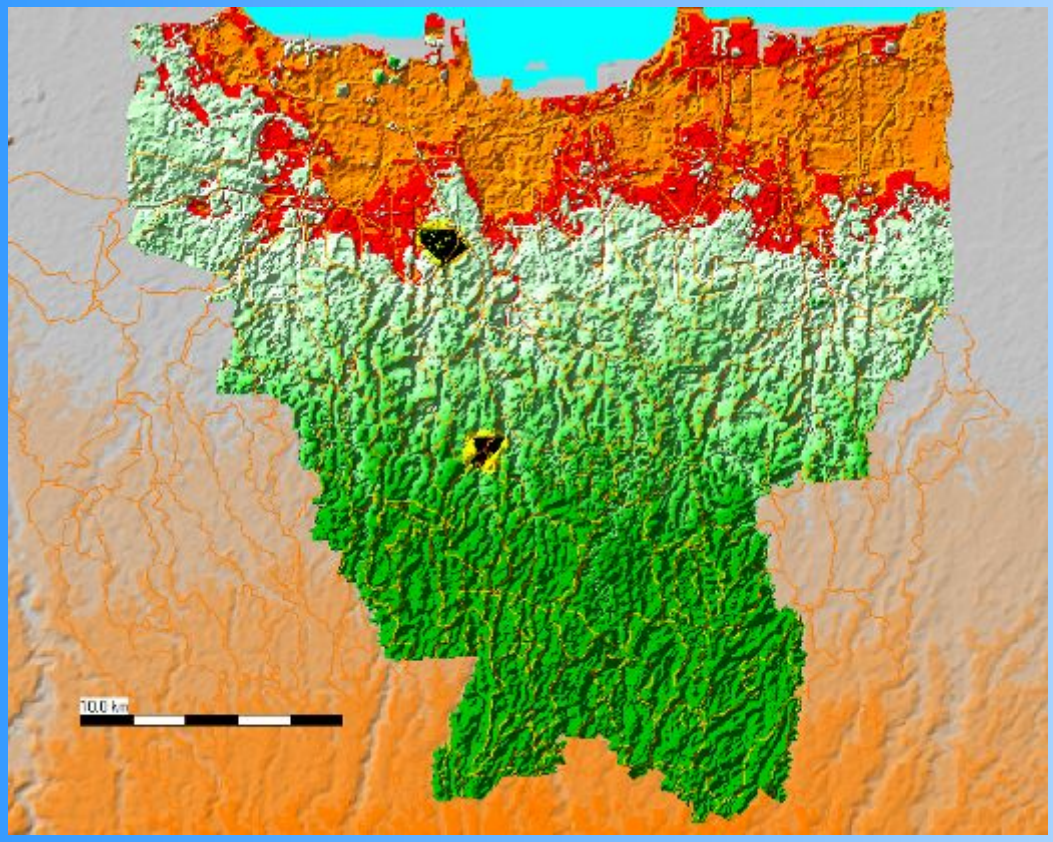
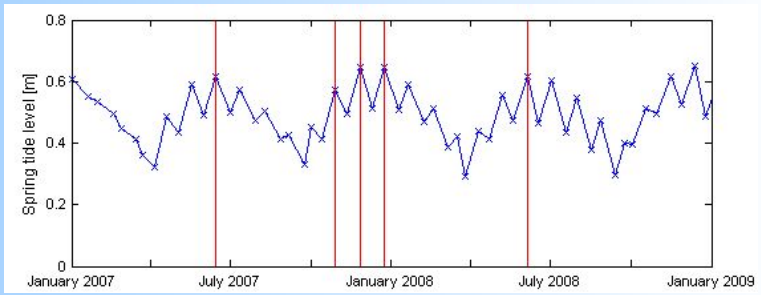
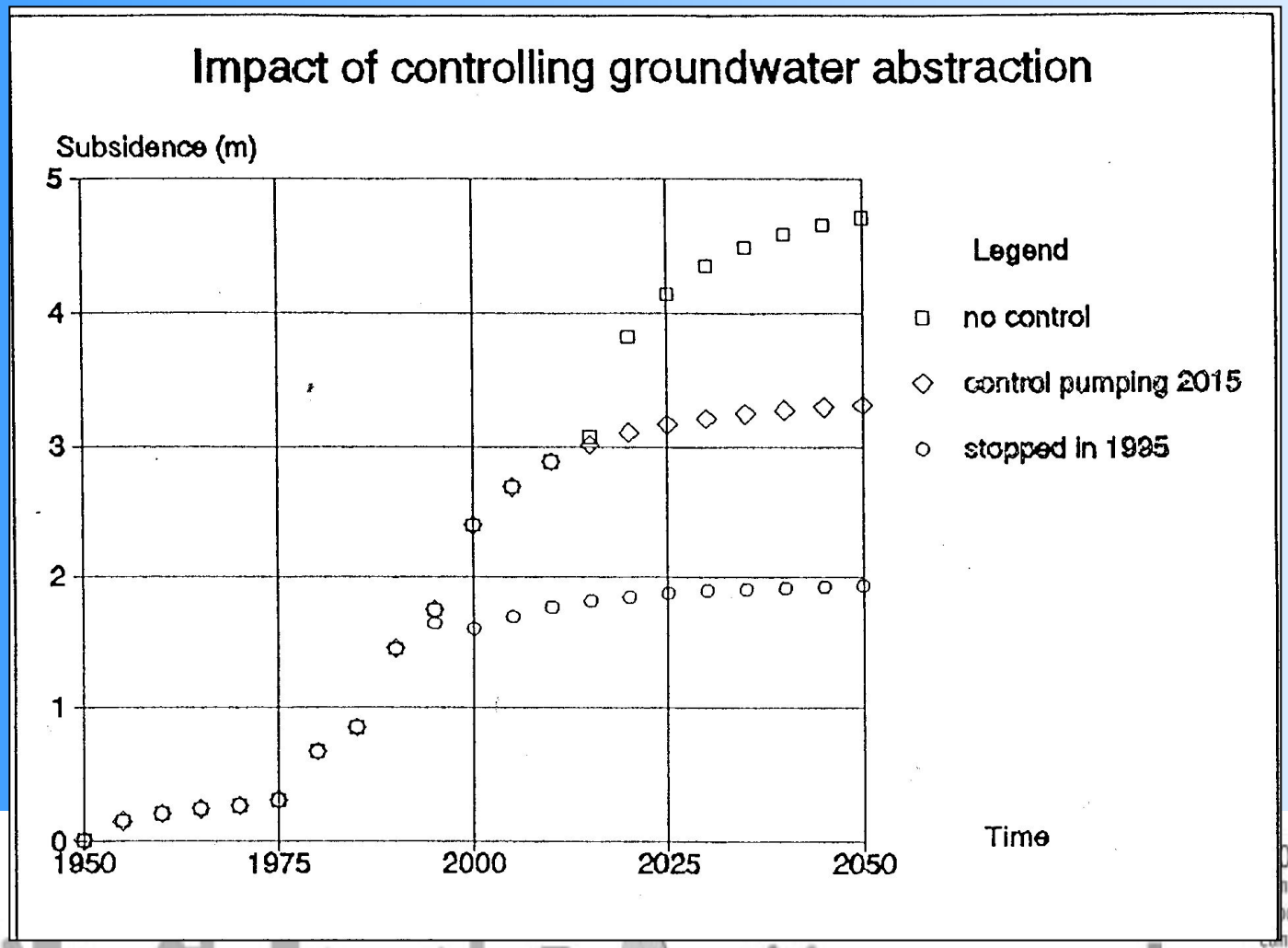
High tide floods 2007: “Signs of a sinking Jakarta”



Pluit	1989-2007	2007-2025	Total
Sea level rise	4-6 cm	4-6 cm	8-12 cm
Subsidence	40-60 cm	40-60 cm	80-120 cm



Jadebotabek Water Resources Management Study (JWRMS,1994)



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d Hazard Mapping
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Part 5

“*Strong knowledge base*”

“*Short-term action*”

Flood Hazard Mapping

- Still a lot of confusion!!
  - Who is right?
  - Who is going to solve this?
  - Who dares to make decision?
- One storey from specialists required!
- “Water knowledge center” for DKI - Jabodetabek

Part 5

Actions and Financing mechanism

ACTION PLAN

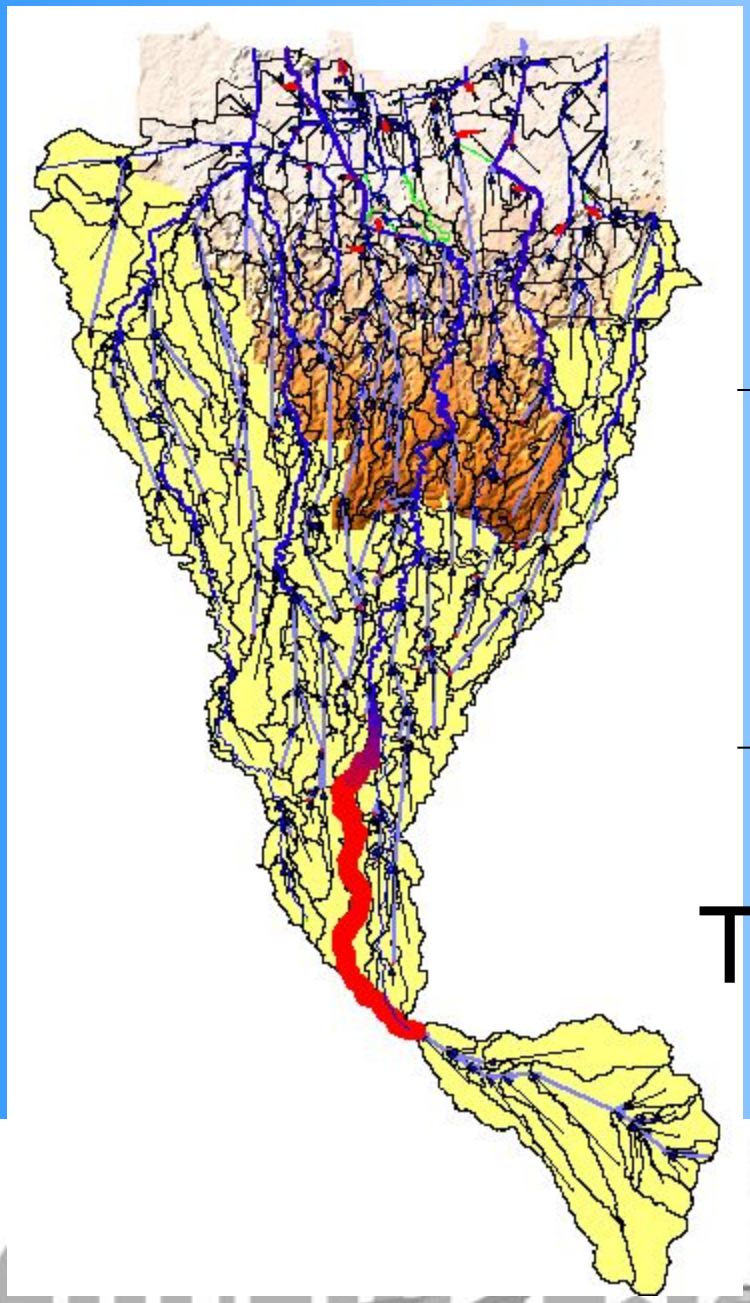
- Short Term:
  - Dredging / East Banjir Canal / Manggarai Gate
  - Stop Ground Water Extraction (industrial)
  - Early Warning System
  - Strict Building Codes

ACTION PLAN

- Medium Term:
  - Bulk Water Supply
  - Stop Ground Water Extraction (household)
  - Solid Waste Management
  - Low Income Housing / Slum Improvement

ACTION PLAN

- Long Term:
  - Water Quality
  - Water Retention Basin / Catchment Area / Sea Defense
  - Land Use and Spatial Planning



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World Bank

JanJaap Brinkman
Deltares – Delft Hdraulics

Thank you!

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