WATER RELATED DISASTER AND ITS MANAGEMENT IN MALAYSIA

FLOODS

BACKGROUND


Paracel Islands
Moulmein
Kyaikkami
Ye
Tavoy
Thailand
Vietnam
Cambodia
Da Lat
Can Tho
Port Blair
Spratly Islands
San Carlos City
Olongapo City
Baguio City
Cabanatuan City
Manila
Legazpi City
Borongan
Sagay
Iloilo City
Butuan City
Cagayan de Oro City
Cotabato City
General Santos City
Ipoh
Medan
Pematang Siantar
Lumpur
Pakanbaru
Malaysia
Samarinda
Palu
Limbung
Bantaeng
Lampung
Cirebon

INTRODUCTIONS

WATER RELATED DISASTERS IN MALAYSIA

- FLOODS
- LANDSLIDES
- DROUGHT
- TSUNAMIES

FLOODS

LANDSLIDES

DEPARTMENT OF IRRIGATION AND DRAINAGE (DID)

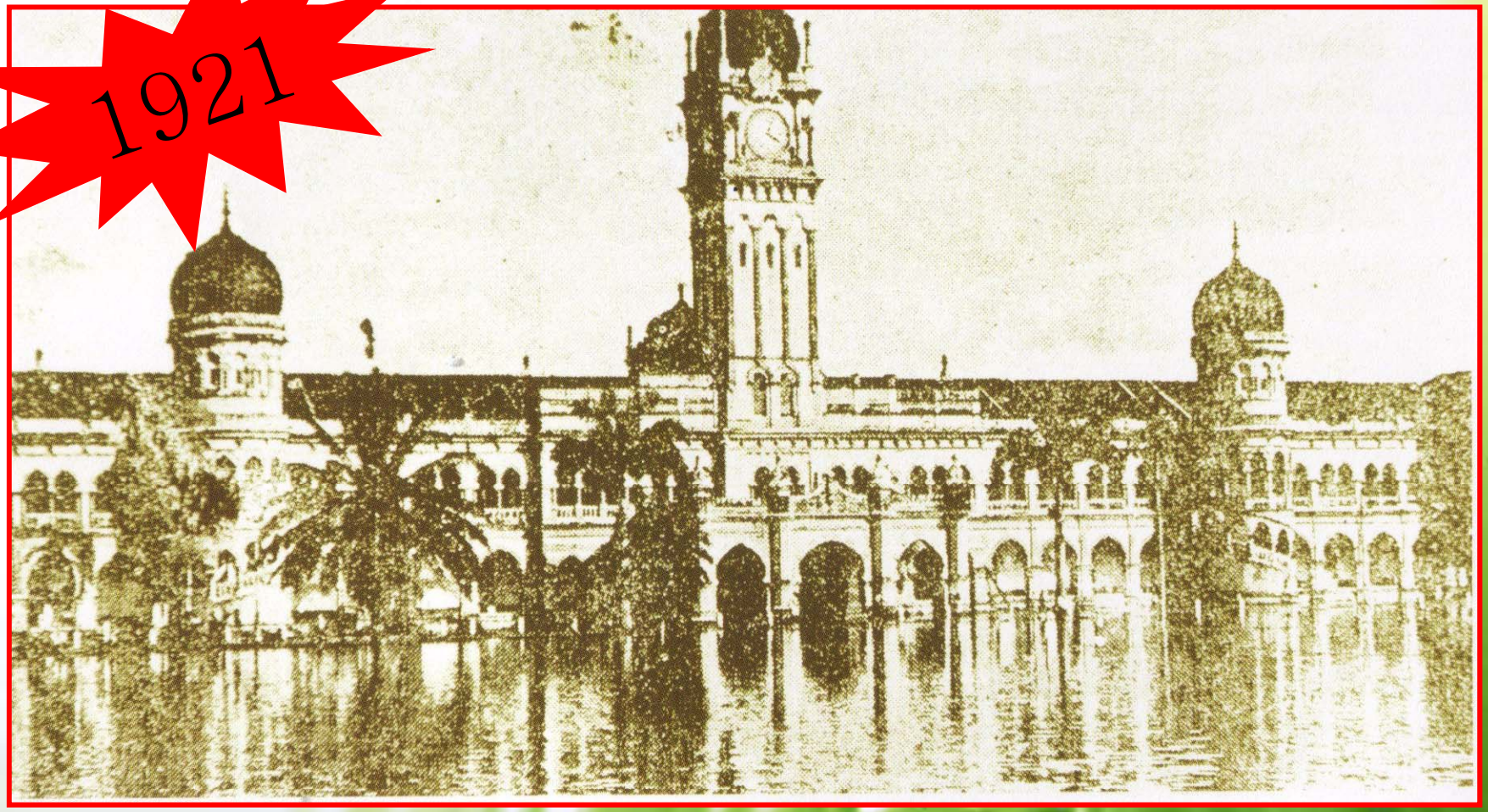
To provide engineering services & technical advices to the Government and the public on the issues of:

- Flood Mitigation
- River Management
- Coastal Management
- Hydrology and Water Resources Management

FLOODS EVENTS IN MALAYSIA

Padang Kelab Selangor

1921



Kuala Lumpur

1921

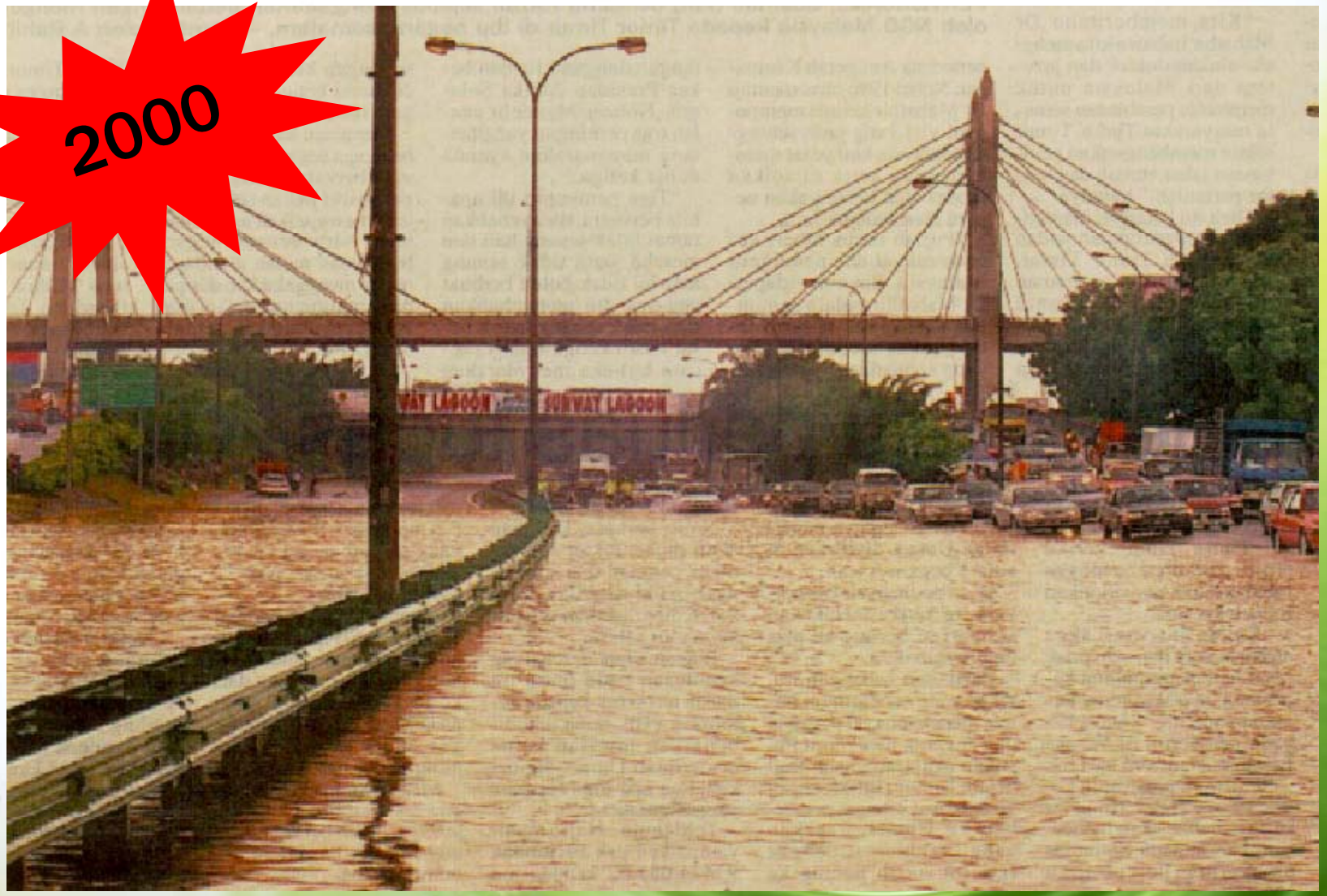
Tun Perak Road, Kuala Lumpur

Padang Kelab Selangor

Kuala Lumpur

Shah Alam, Selangor

Shah Alam, Selangor



Federal Highway, Kuala Lumpur

Bangunan Sultan Abdul Samad, Kuala Lumpur

2006

100 motorists stranded as floods hit JB

JOHOR BARU: More than 100 motorists were left stranded here yesterday after a heavy downpour left a portion of one of its main roads, Jalan Ayer Molek, in a metre of water.

Just two weeks ago, the same 1km was flooded, resulting in a massive traffic jam in the area.

Angry members of the public said the area was prone to flood in as fast as 10 minutes following a heavy downpour.

Mohammad Boon Abdullah, 32, who had parked his car outside the Wisma Persekutuan building at about 2pm was shocked to find it in flood water.

Apparently, the floods have worsened since the MPBJ constructed the new drainage system that cost the council an estimated RM10mil.

"The contractor did not do a good job," said a man who only wanted to be known as Lee. He added that the floods were caused by rubble from the construction blocking the drains.

Meanwhile, a taxi was badly damaged when a tree crashed on it in Jalan Yahya Awal in front of the Hutan Bandar park.

The driver, Junaidi Mohamad Kusari, 38, narrowly escaped death as he had stopped his taxi for a break.

"I parked by the road when I saw the tree about to crash. It was lucky I managed to get out in time," he said.

Junaidi, who has been a taxi driver for 15 years, said the estimated cost of repairing his taxi would be about RM20,000.

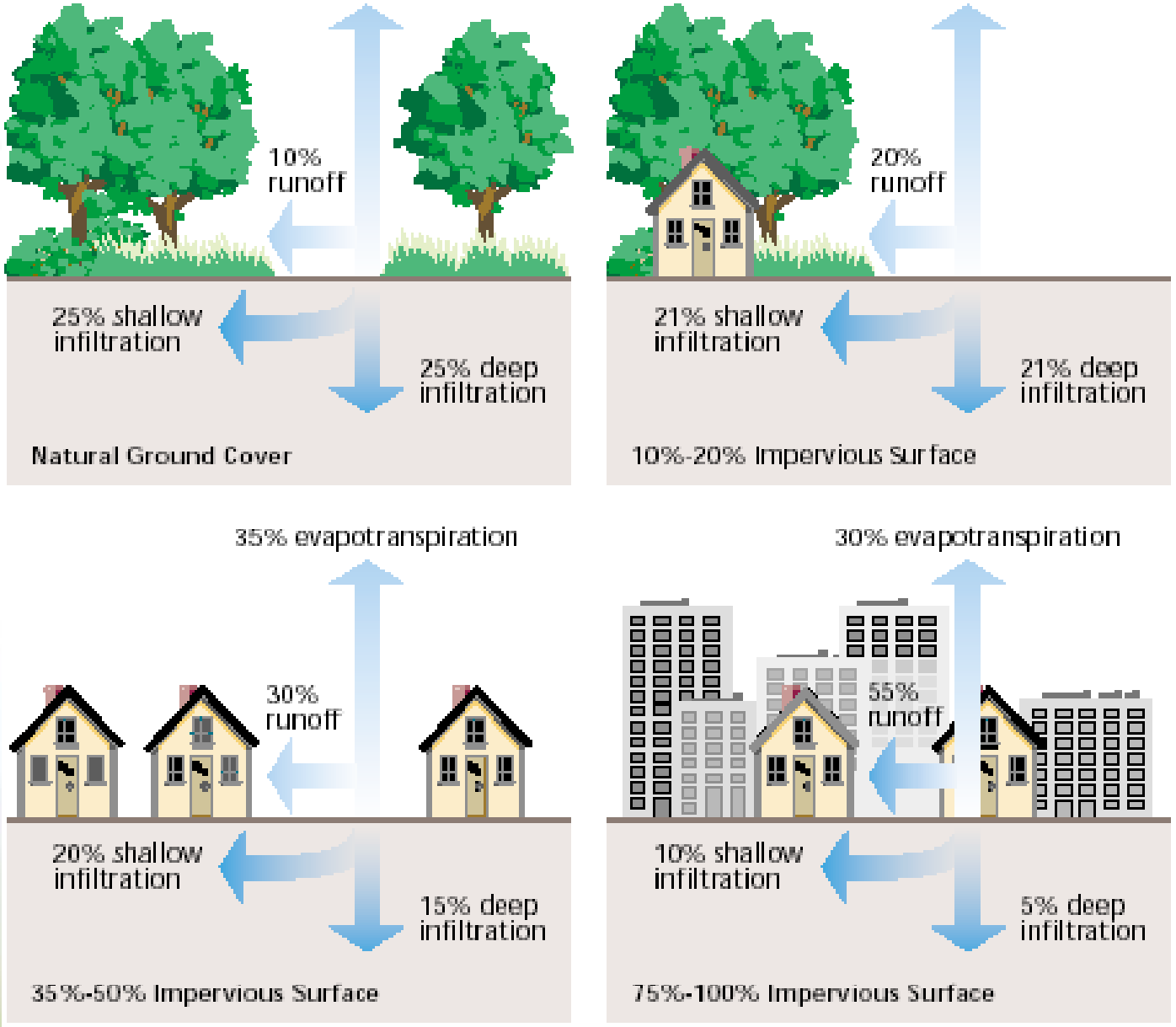
Jalan Ayer Molek, Johor Bahru, Johor

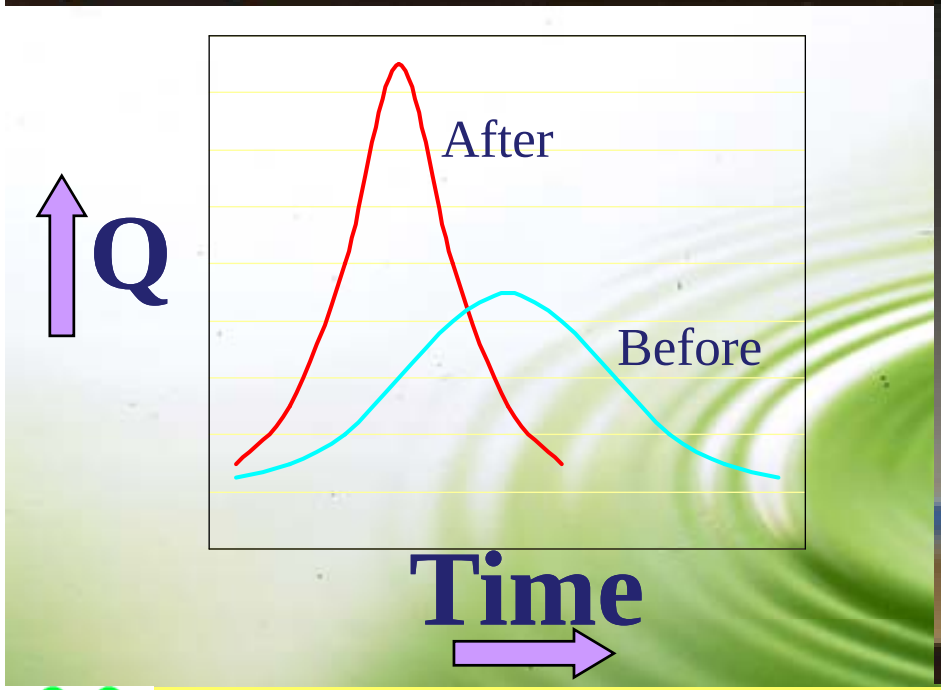
Jalan Sultan Ismail, Kuala Lumpur

Bangunan Sultan Abdul Samad, Kuala Lumpur

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization


10% runoff
25% shallow infiltration
25% deep infiltration
Natural Ground Cover
20% runoff
21% shallow infiltration
21% deep infiltration
10%-20% Impervious Surface
35% evapotranspiration
30% runoff
20% shallow infiltration
15% deep infiltration
35%-50% Impervious Surface
30% evapotranspiration
55% runoff
10% shallow infiltration
5% deep infiltration
75%-100% Impervious Surface

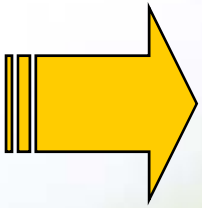

Q
After
Before
Time

Effect of Urbanisation

Increase in

Impermeable

Area = 0 - 40%



Time of concentration - 50% reduction

Runoff - 190% increase

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage

Development extending into and taking flood plains and drainage corridors

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage
- Inadequate drainage systems

Undersize Triple Cell Culvert

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage
- Inadequate drainage systems
- Constriction at bridges and culverts, water flow block by debris or other cause

LRT Piers in river channel


Bottle neck


Water level during flooding on 2002

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage
- Inadequate drainage systems
- Constriction at bridges and culverts, water flow block by debris or other cause
- Siltation in waterway channel

Uncontrolled Land CLearing

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage
- Inadequate drainage systems
- Constriction at bridges and culverts, water flow block by debris or other cause
- Siltation in waterway channel
- **Localized continous heavy rainfall**

DEPARTMENT OF IRRIGATION AND DRAINAGE

FLOODED HOUSING AREA

Kawasan perkampungan ditenggelami air banjir.

FLOODED AGRICULTURAL AREA

Kawasan penanaman sawah padi musnah akibat banjir.

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage
- Inadequate drainage systems
- Constriction at bridges and culverts, water flow block by debris or other cause
- Siltation in waterway channel
- Localized continous heavy rainfall
- Tidal back effect

FLOOD DUE TO TIDAL EFFECT

Port Klang, December 1999

ISSUES RELATED TO FLOODS

- Increased runoff rates due to urbanization
- Loss of flood storage
- Inadequate drainage systems
- Constriction at bridges and culverts, water flow block by debris or other cause
- Siltation in waterway channel
- Localized continous heavy rainfall
- Tidal back effect
- Inadequate river capacity

FLOOD MITIGATION

APPROACH & ACTIONS

Permanent Flood Control Commission

- Established in 1971
- Objective :

  Prevention Rather Than Cure

- Strategies :
  - To take measures for flood control and to reduce the occurrence of floods
  - In the event of floods, to minimize damage & loss to life and property

APPROACH AND ACTIONS

Flood Disaster Relief Machinery

- Objective :

  Coordinating relief operations at federal, states and districts level

- To provide assistance to flood victims in orderly & effective manner
- The committee is empowered to getting the financial assistance from the Federal Government for remedial works eg: shelter, rescue & food supplies
- Members:
  - Government Department / Agencies
  - Non-Government Organization (NGO)

APPROACH AND ACTIONS

River Basin Studies

- Objective :

  To draw up appropriate flood maps and also feasible projects for development as well as water resources are properly manage for the respective basin areas

- Flood Mitigation For Major River Basins
- Drainage Masterplan Studies

FLOOD MITIGATION STRATEGIES

Flood Mitigation Measures

- Structural Measures

FLOOD CONTROL DAMS

Dams constructed to retain water to protect downstream of the dams

CANALIZATIONS AND RELATED WORKS

Before

After

Lining of banks and beds of channel

CANALIZATIONS AND RELATED WORKS

widening and deepening of channels

BUNDING OF RIVERS

Concept of Bunding Construction

Scenario 1 : River Without Bund

Scenario 2 : River Widening & Deepening Without Bund

Scenario 3 : River With Bund, extended to Flood Plain

Scenario 4 : River with bund at minimum distance

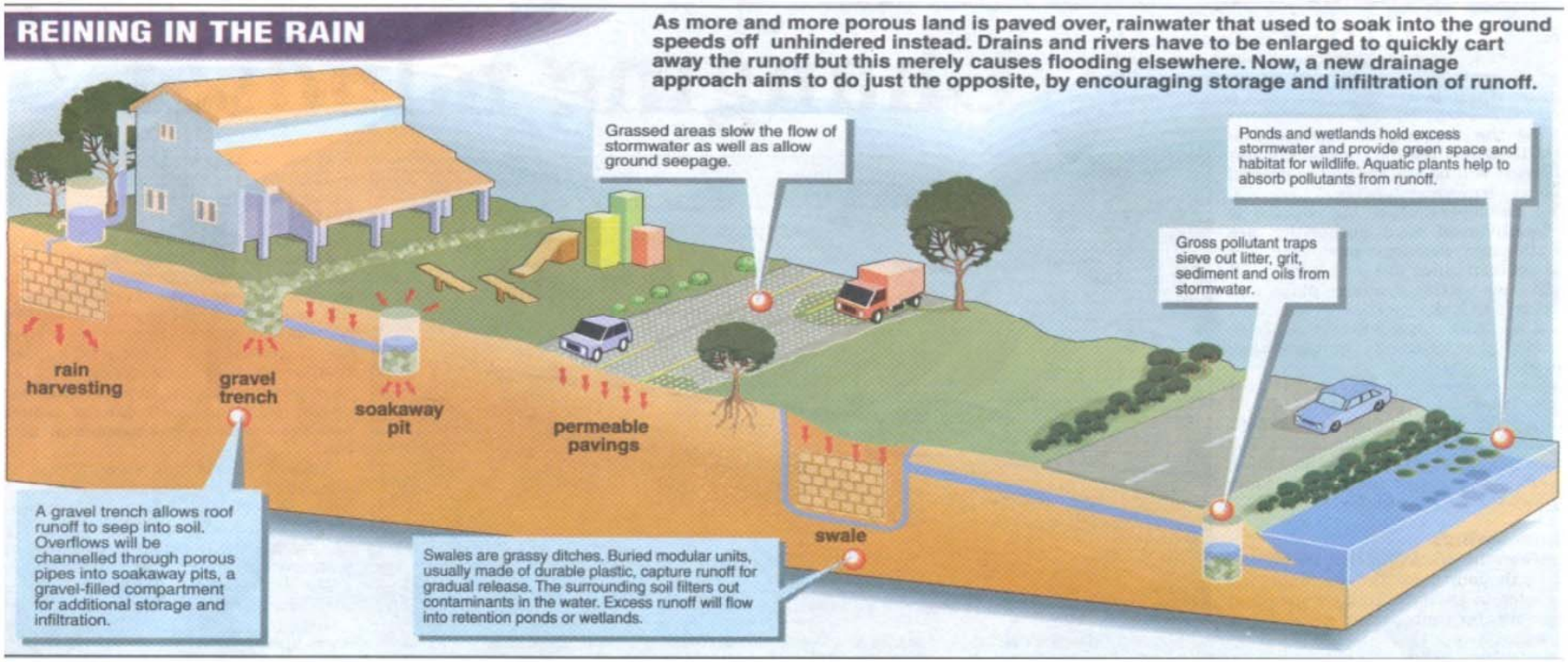
STORAGE PONDS OF FLOOD ATTENUATION

STORAGE PONDS OF FLOOD ATTENUATION

STORAGE PONDS OF FLOOD ATTENUATION

Storage Pond of Sungai Batu

STORAGE PONDS OF FLOOD ATTENUATION

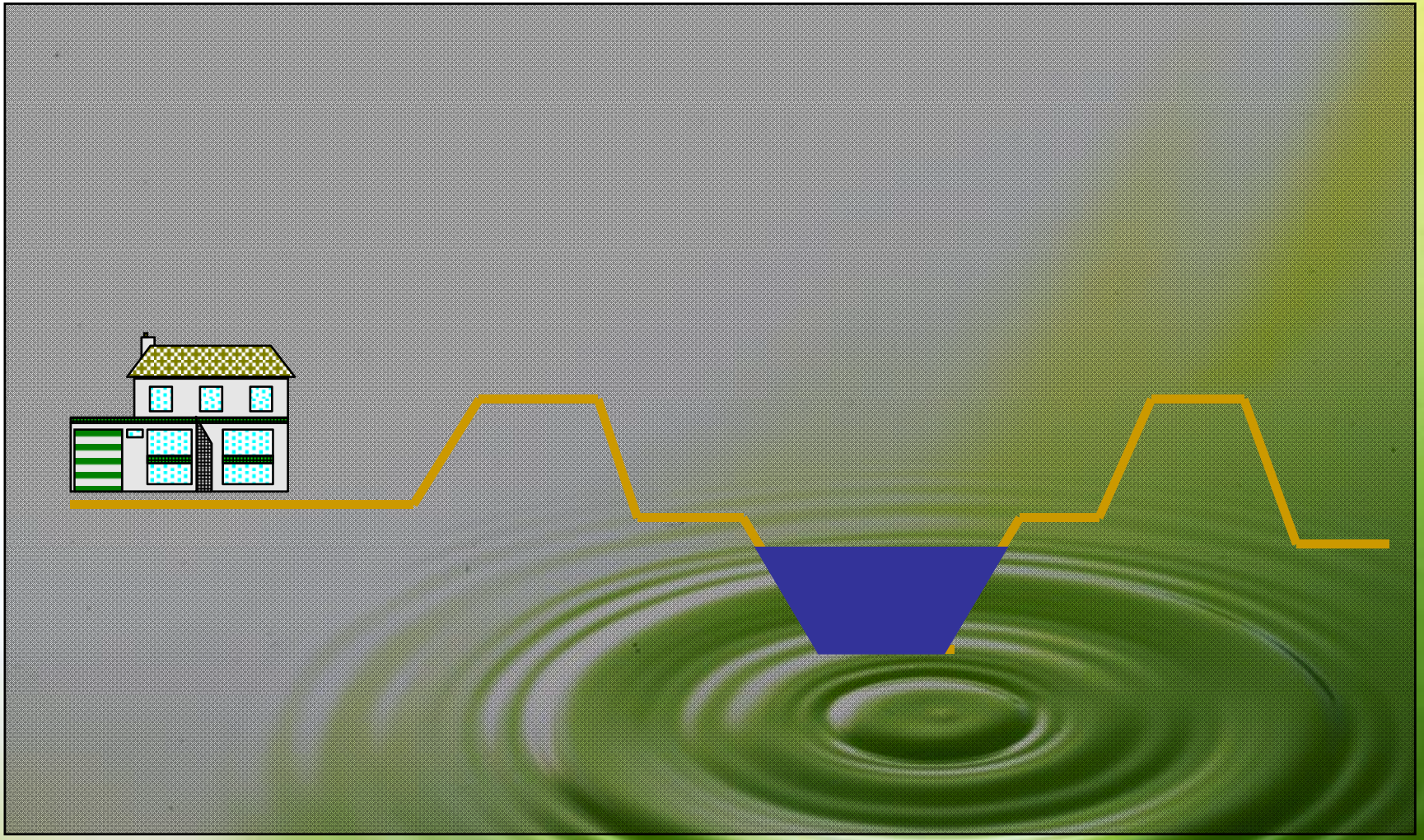


MASMA CONCEPT

POLDERING (RING BUND)

TAMAN SRI MUDA

POLDERING (RING BUND)



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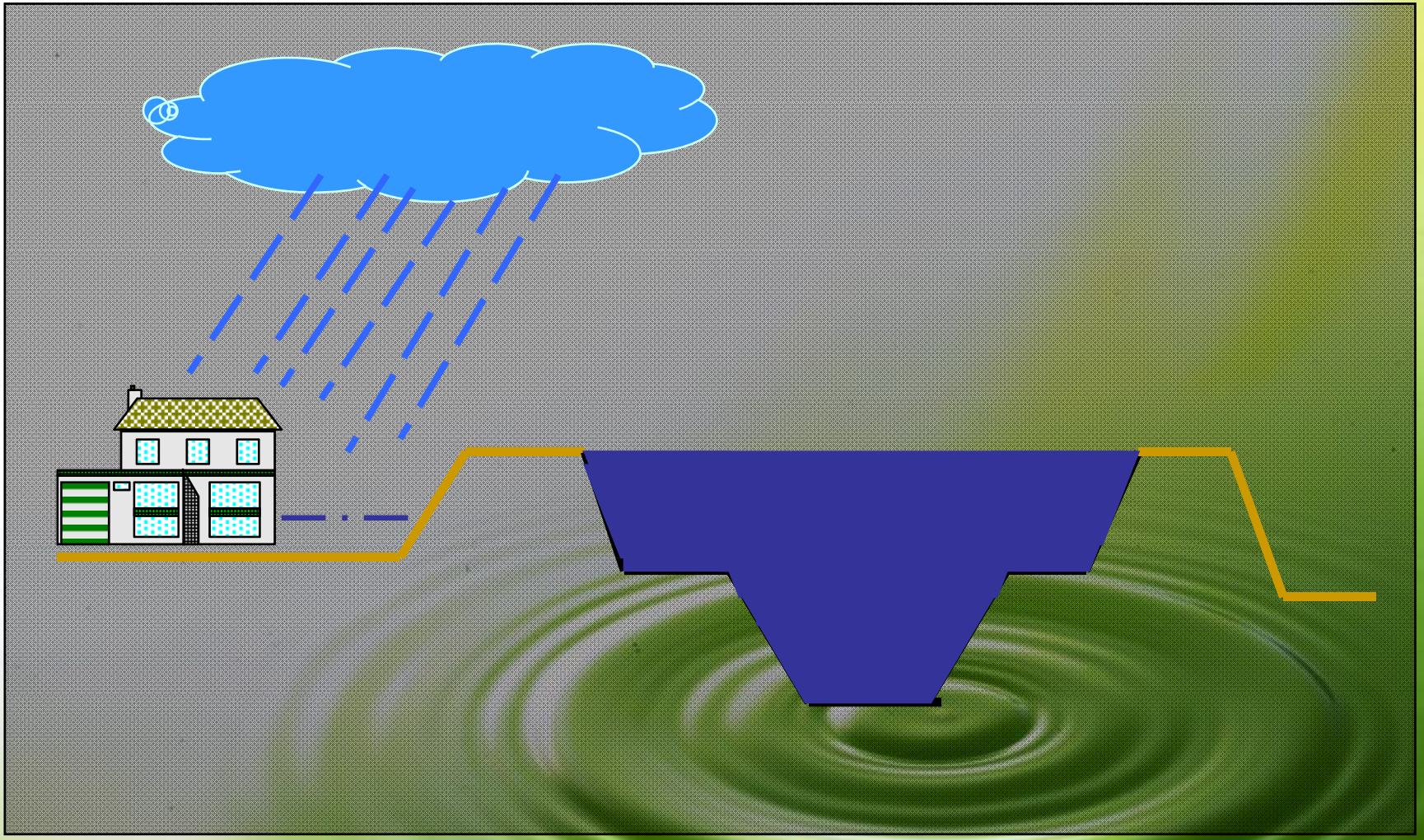

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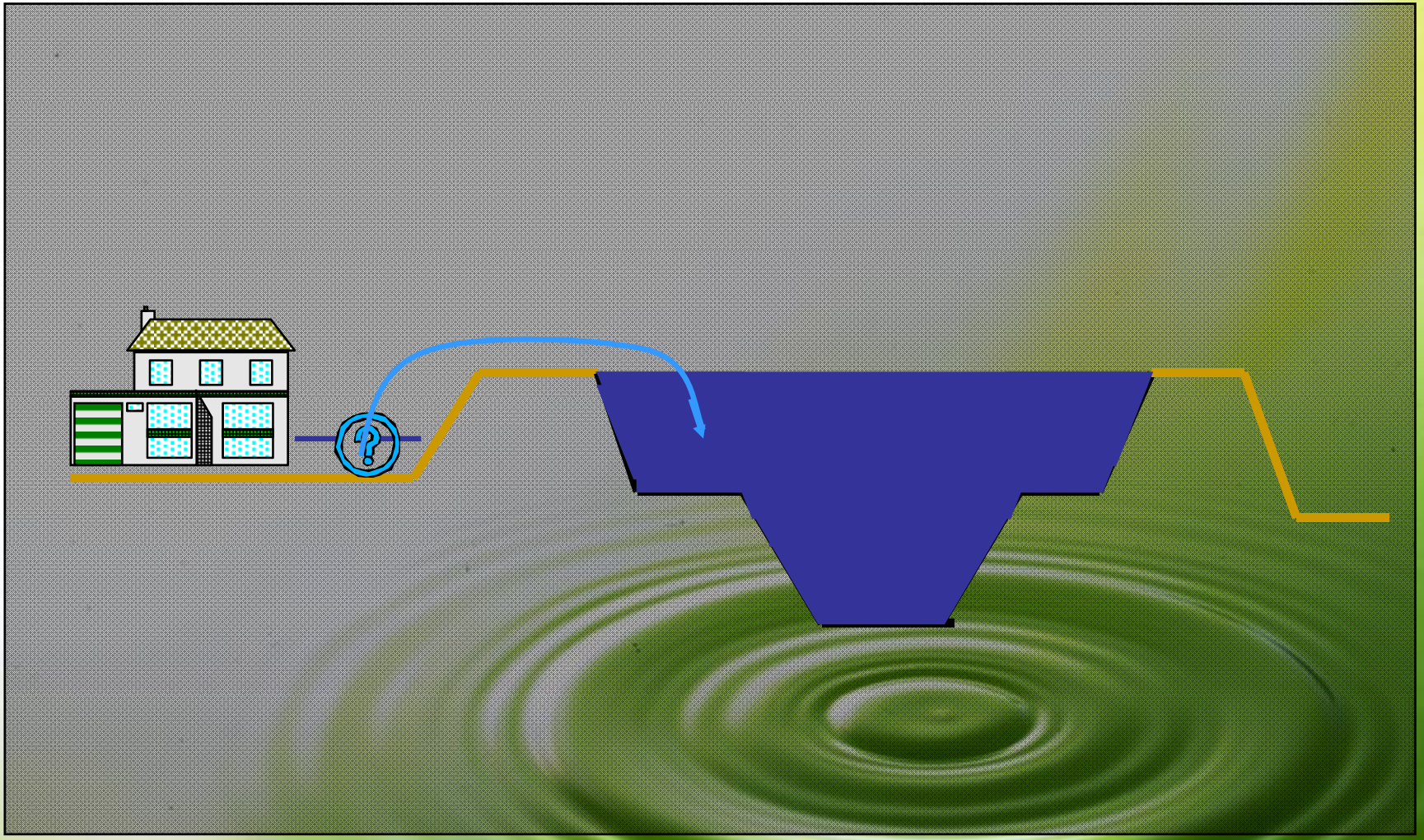

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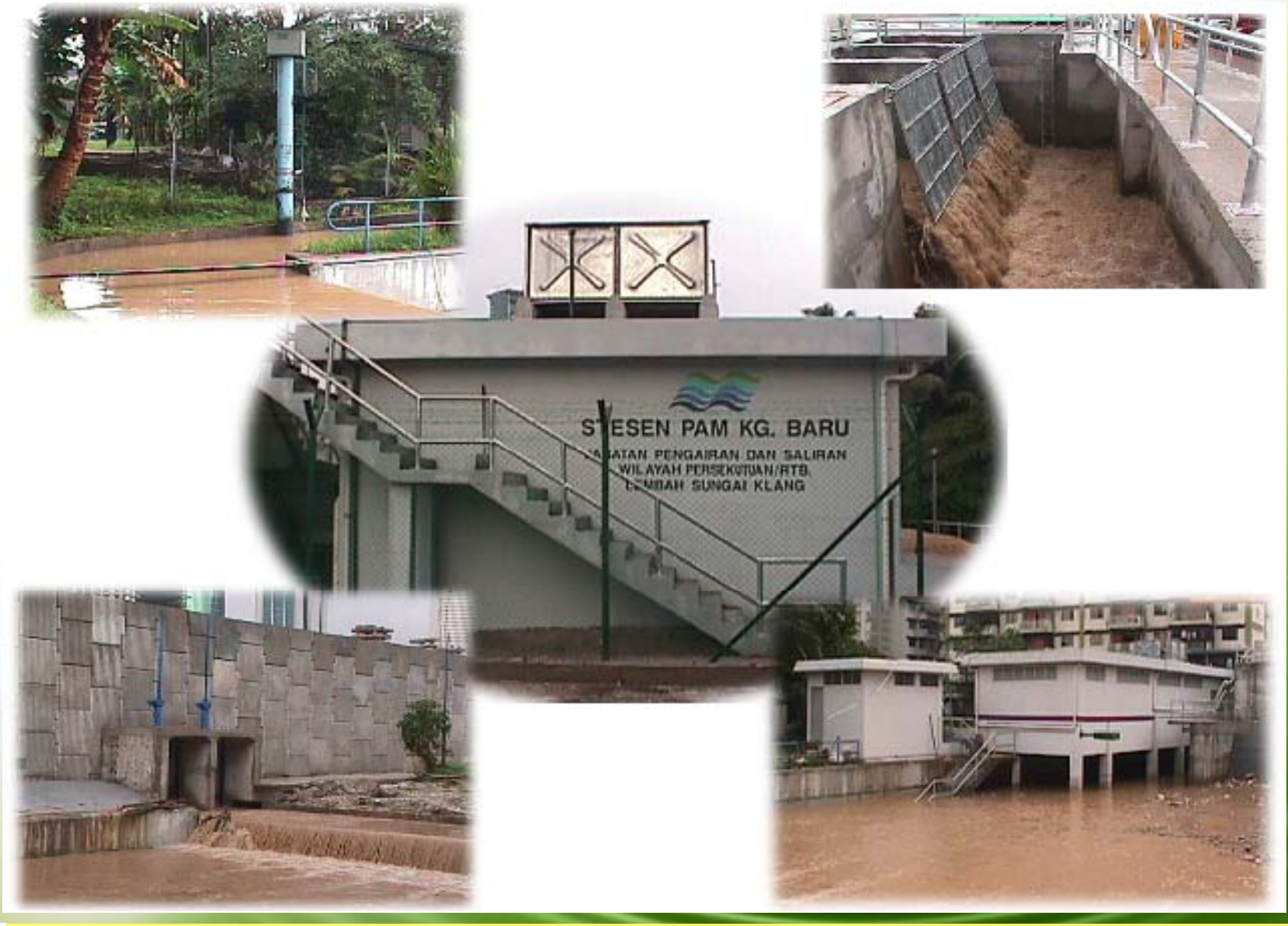


FLOOD DIVERSION CHANNEL OR TUNNEL

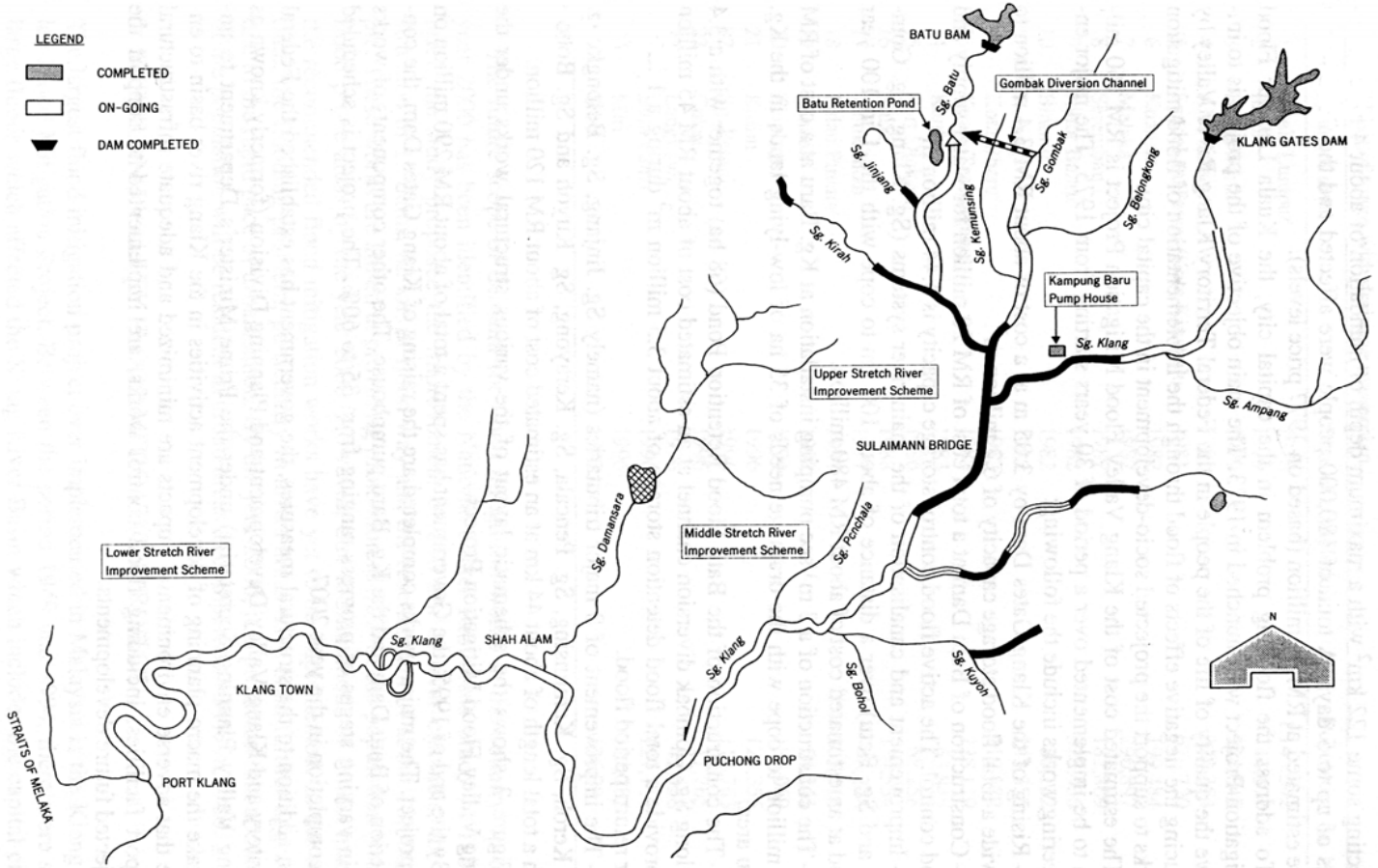
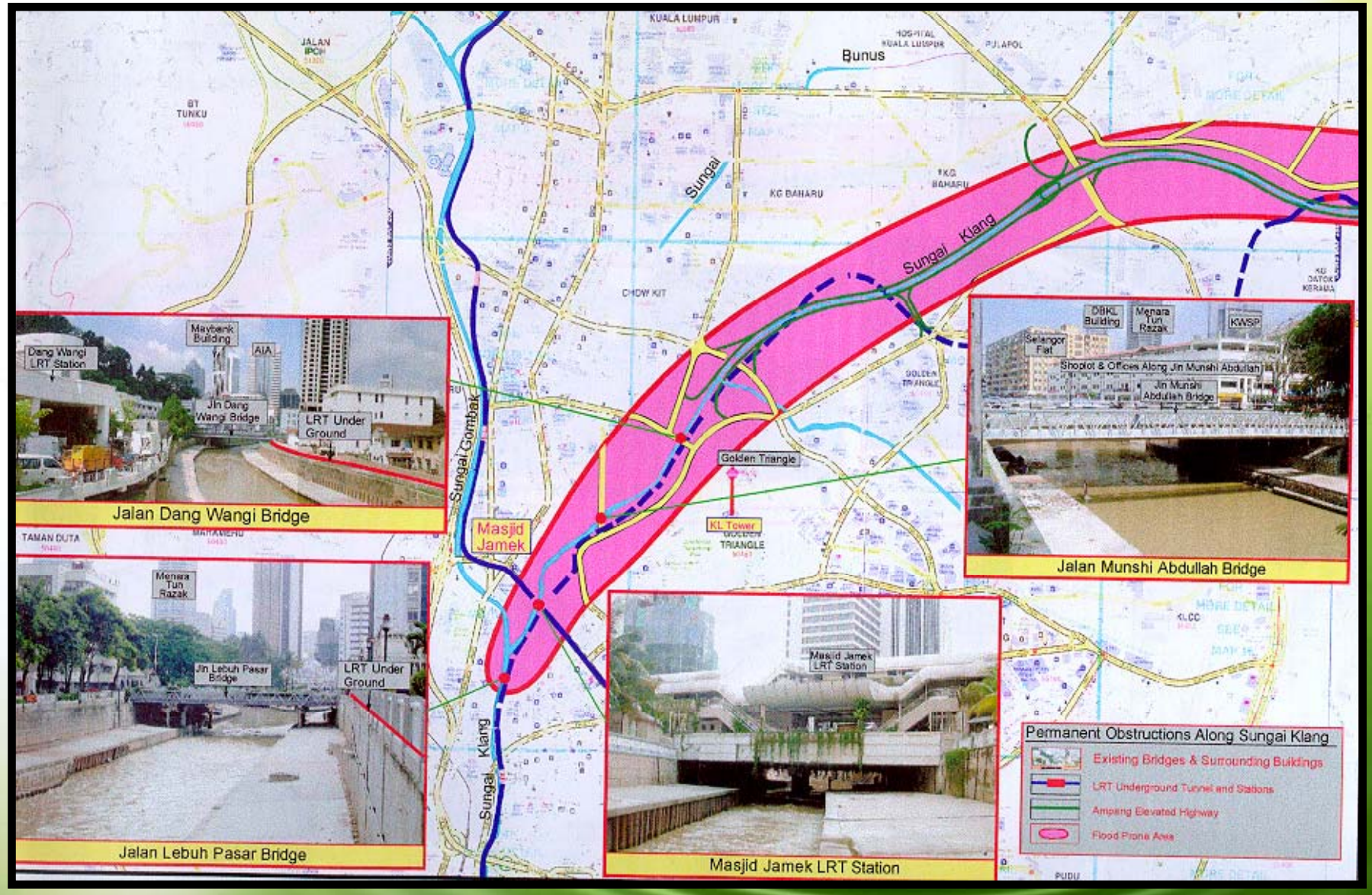


Figure 3. Layout of the Klang Valley Flood Mitigation Project.

FLOOD DIVERSION CHANNEL OR TUNNEL



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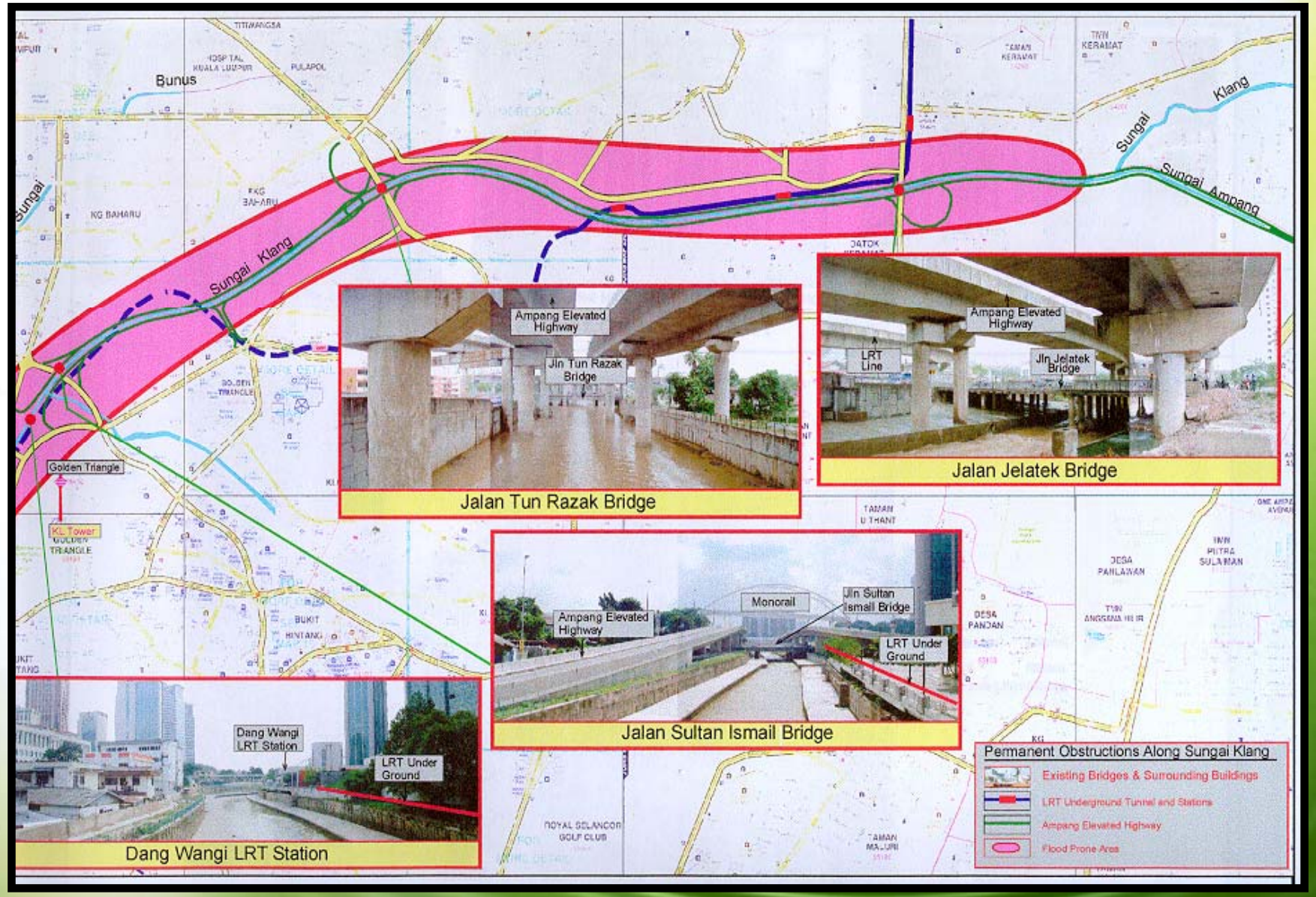

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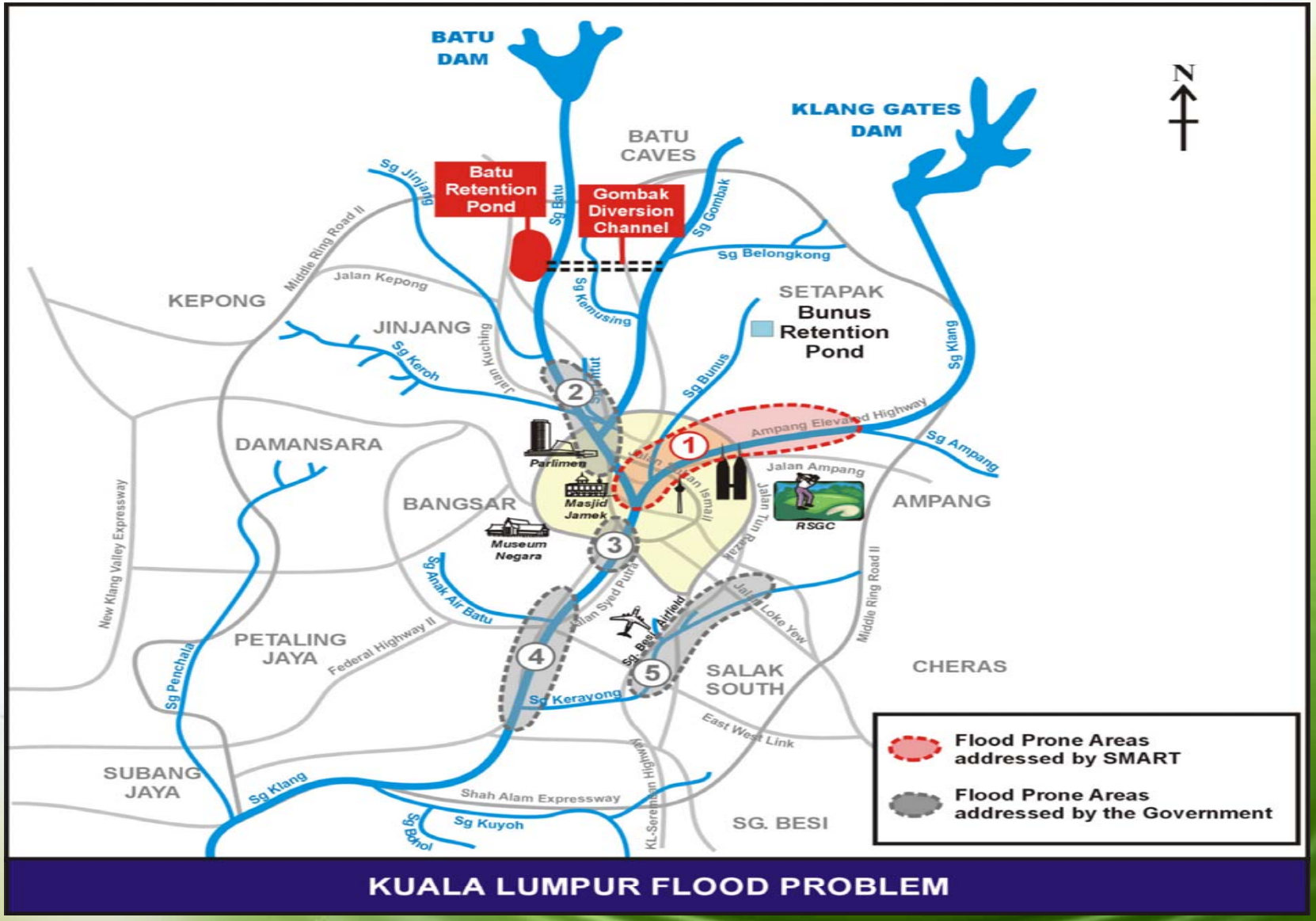

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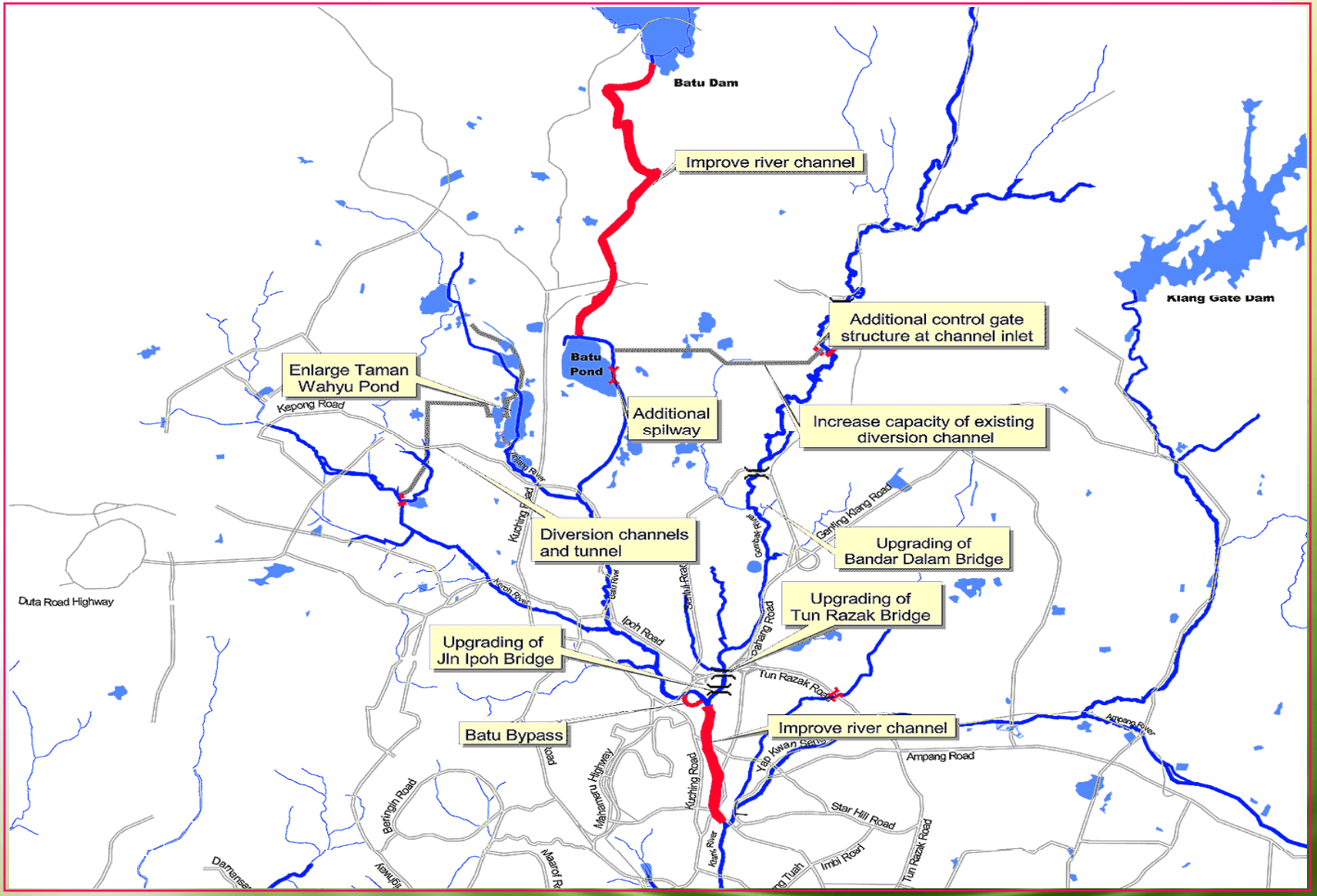

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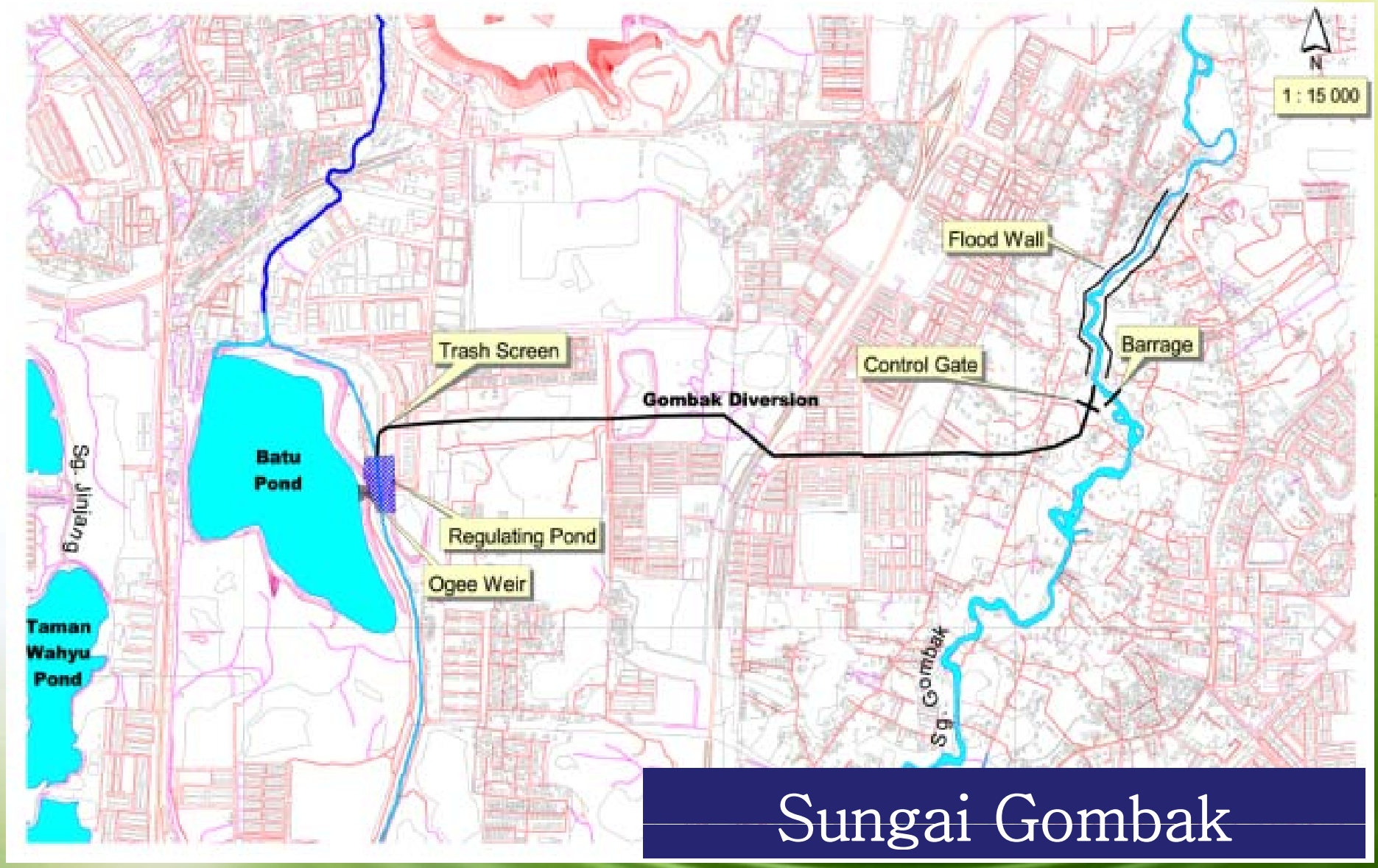
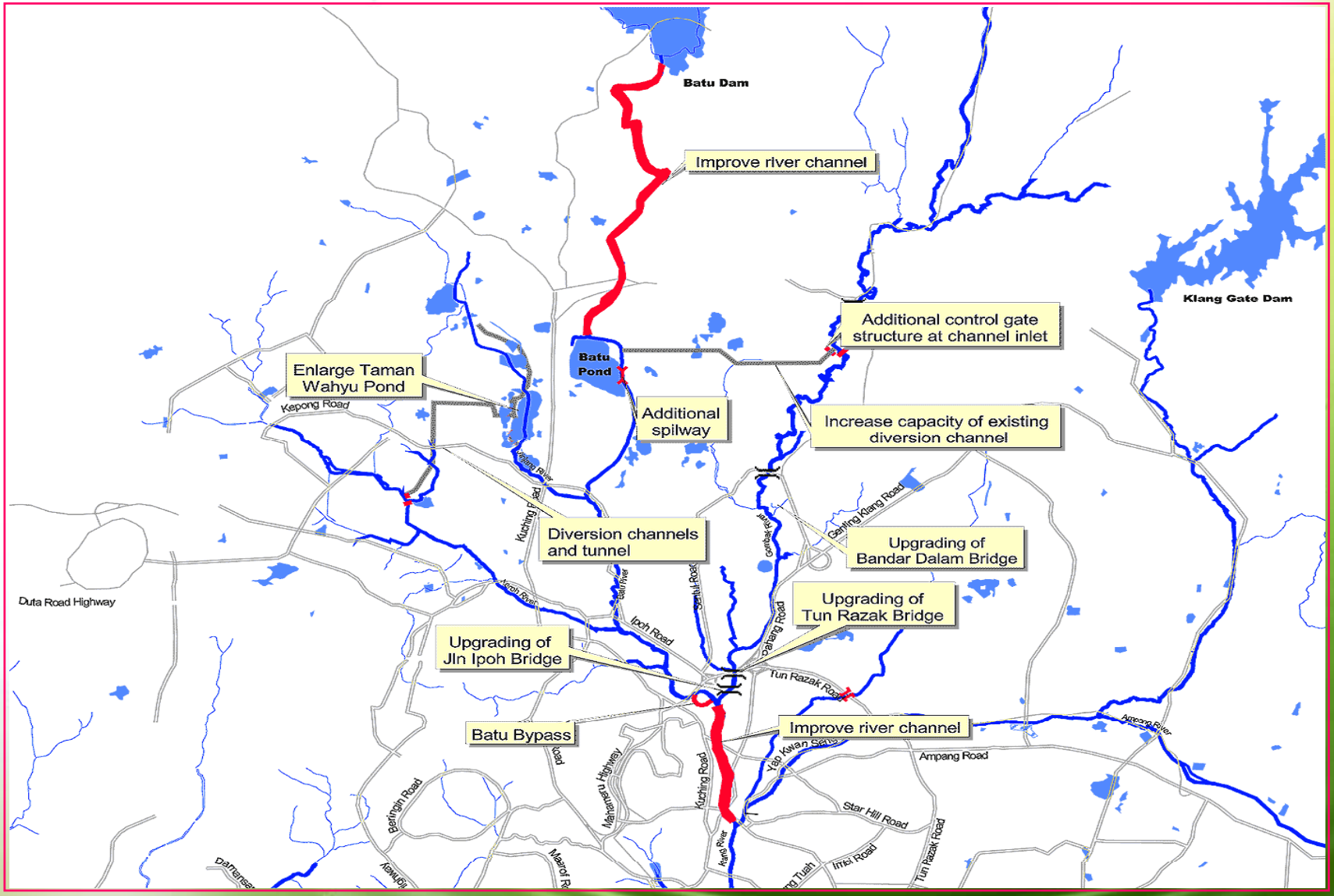
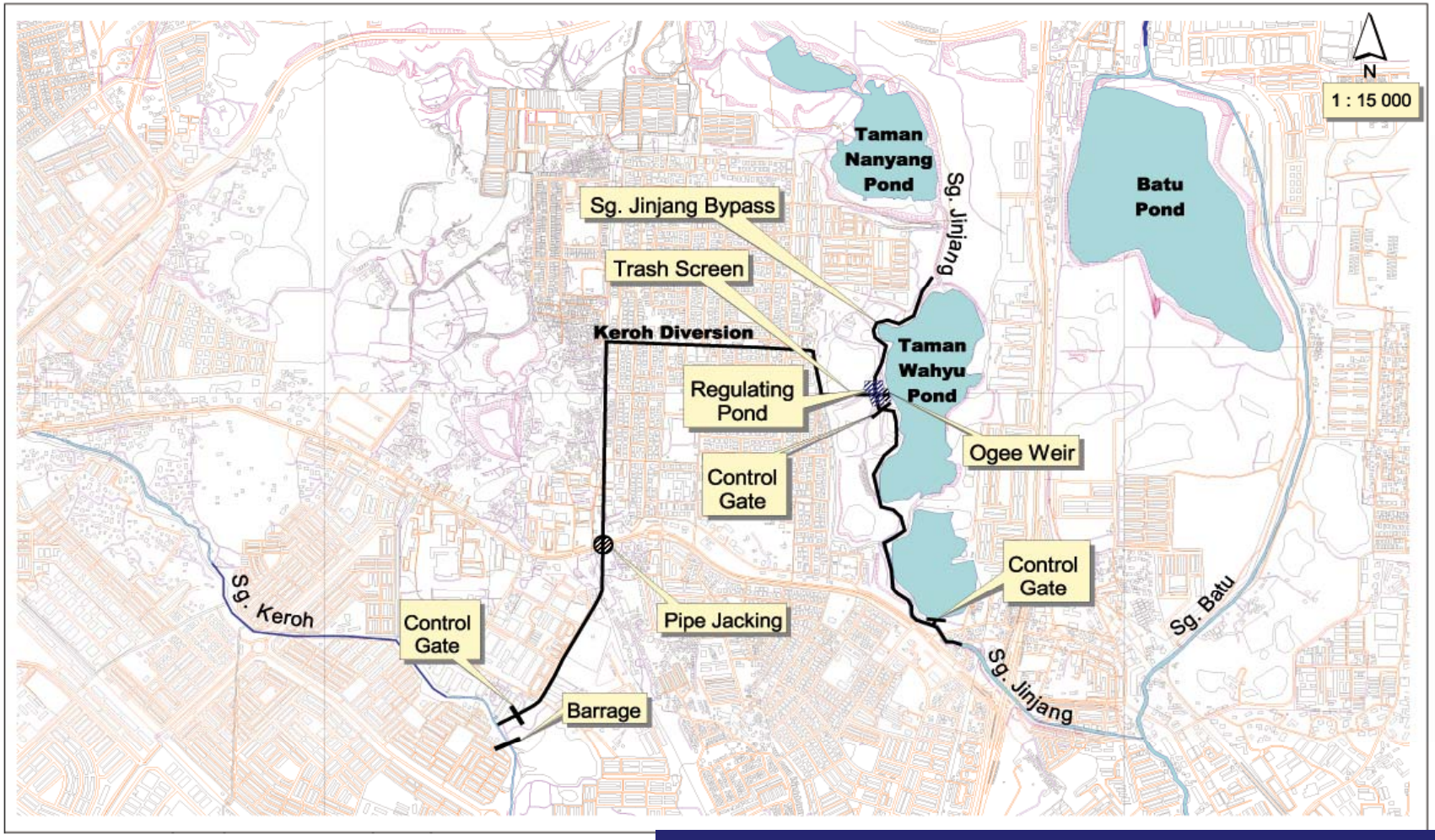


FLOOD DIVERSION CHANNEL OR TUNNEL

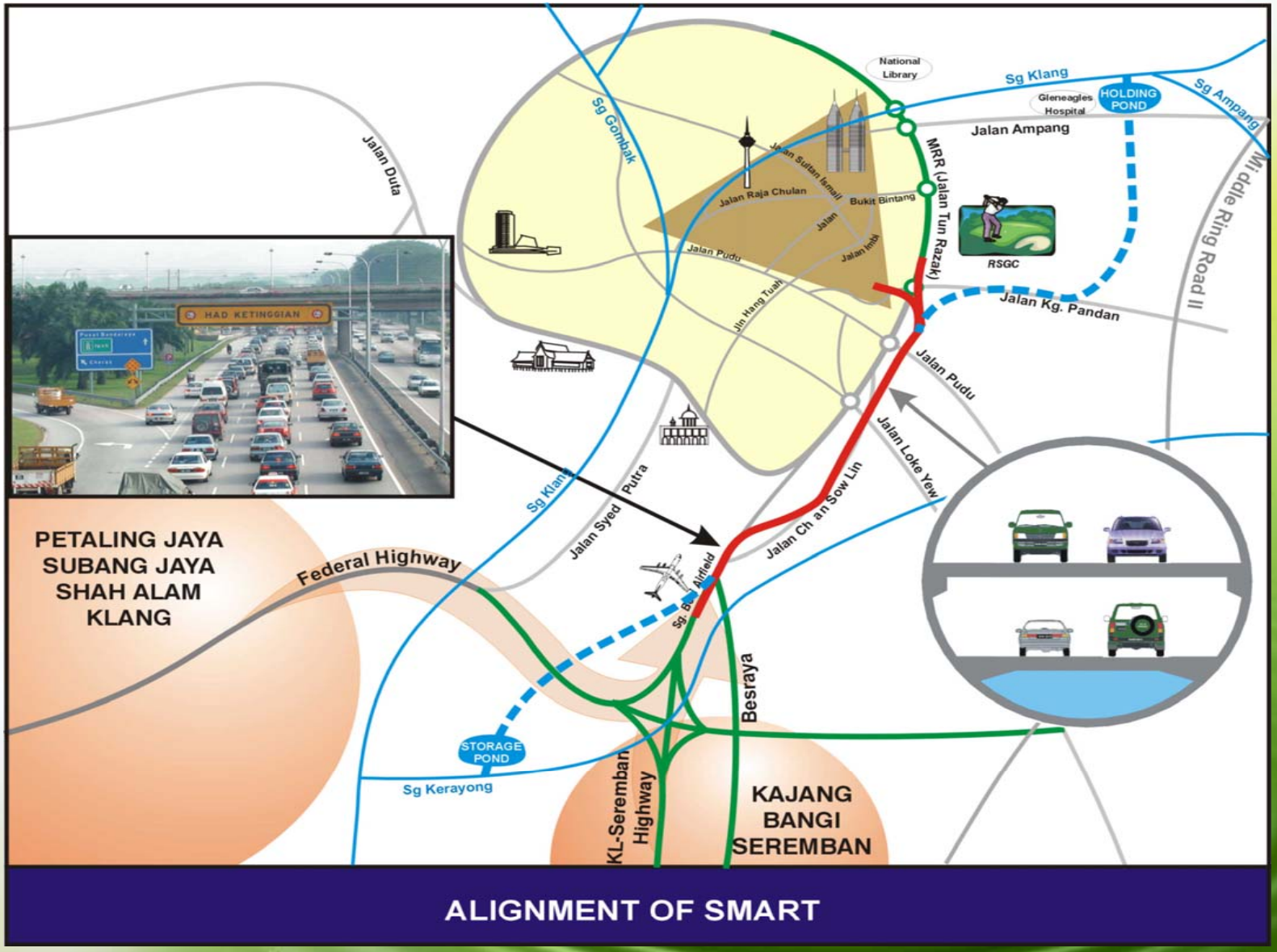


FLOOD DIVERSION CHANNEL OR TUNNEL



Sungai Keroh Diversion

FLOOD DIVERSION CHANNEL OR TUNNEL



FLOOD MITIGATION STRATEGIES

- River Basin Studies
- Structural Measures
- Non-Structural Measures

INTEGRATED RIVER BASIN MANAGEMENT

- The river basin is planned in integrated manner and all factors are taken into consideration when certain development plan is proposed.
- The factors are zoning the river corridors, riparian areas, natural flood plain, conservation of wetlands and storage ponds will be taking into consideration in flood management plan

PREPARATION OF GUIDELINES & DESIGN STANDARDS

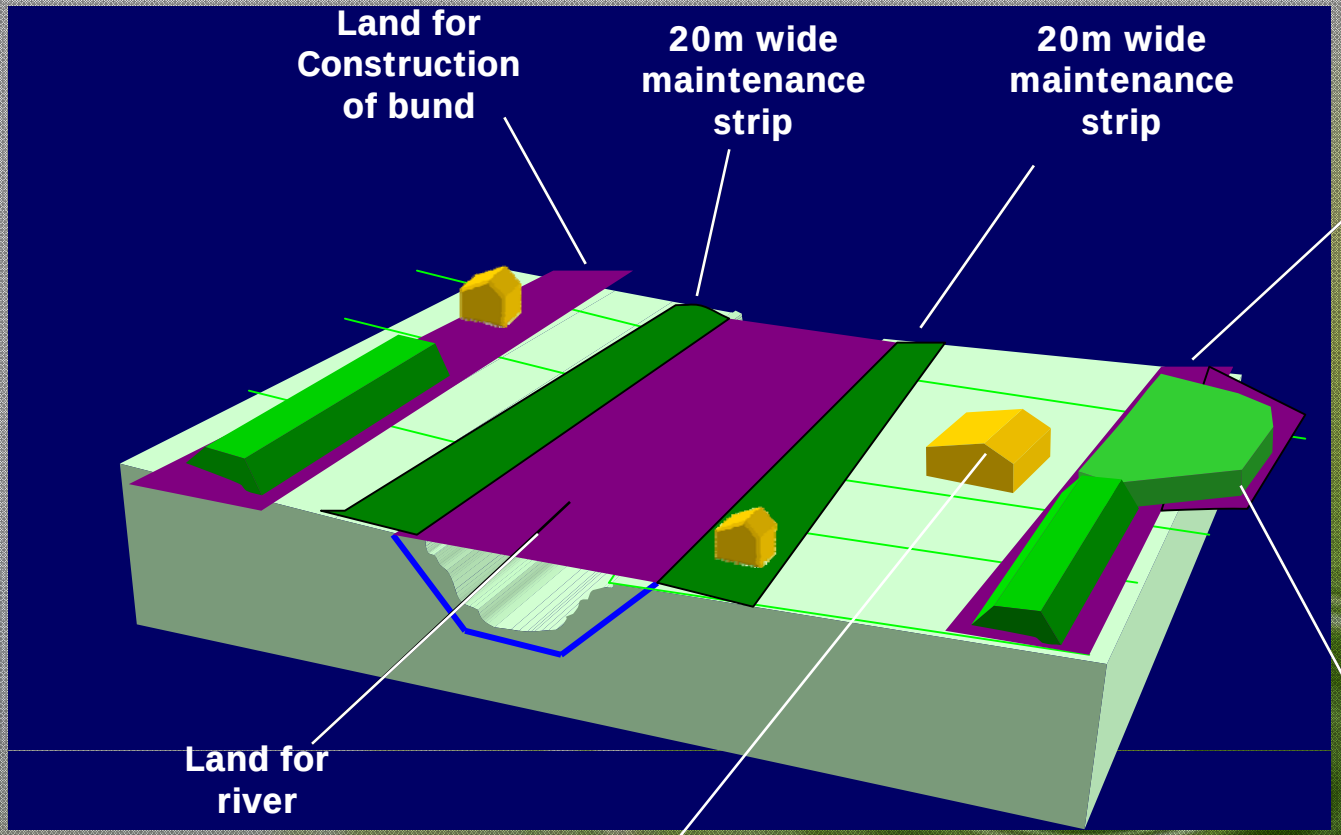
- Guidelines and design standards have been prepared, specifying cleat requirements both physicals and technical, for river and their reserves, flood mitigation and urban drainage projects.
- DID have published more than 20 Hydrological Procedures, Urban Stormwater Management Manual (MASMA) and DID Manual.
- These guidelines and design standards if followed strictly will help to minimize the occurrence of floods

RESETTLEMENT OF POPULATION

Land & Social Issues

RESETTLEMENT OF POPULATION

PROPOSED LAND ACQUISITION



RESETTLEMENT OF POPULATION

CLUSTER ARRANGEMENT

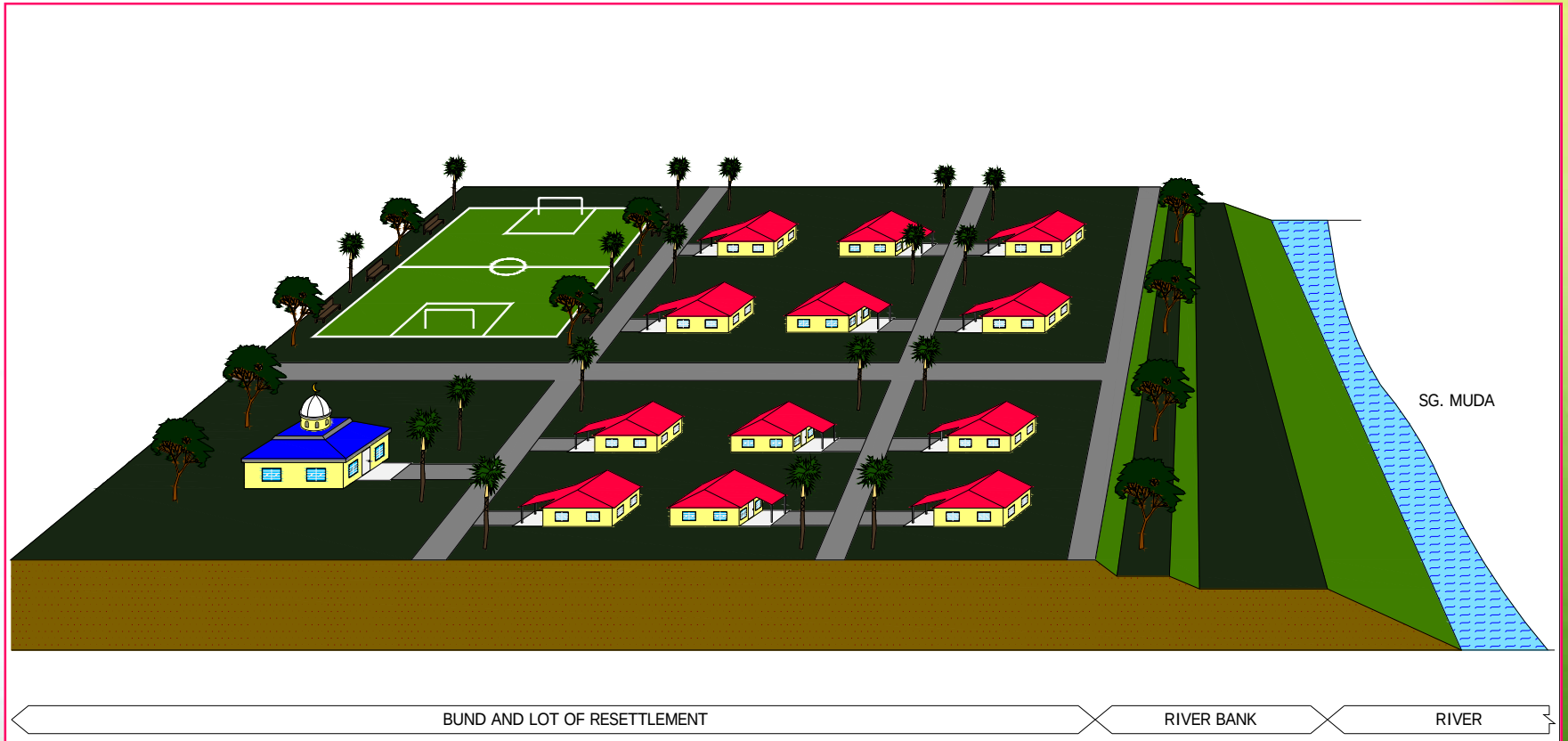


FIGURE. 2 - TYPICAL PLAN OF RESETTLEMENT WITH CLUSTER ARRANGEMENT

RESETTLEMENT OF POPULATION

LINEAR ARRANGEMENT

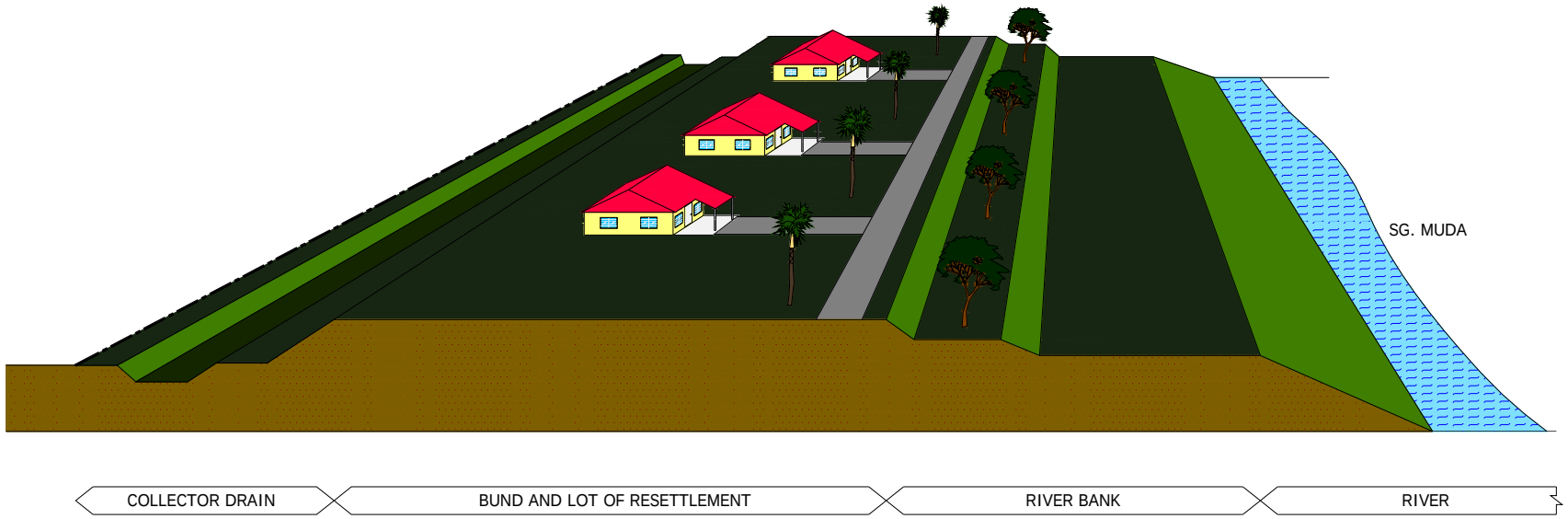
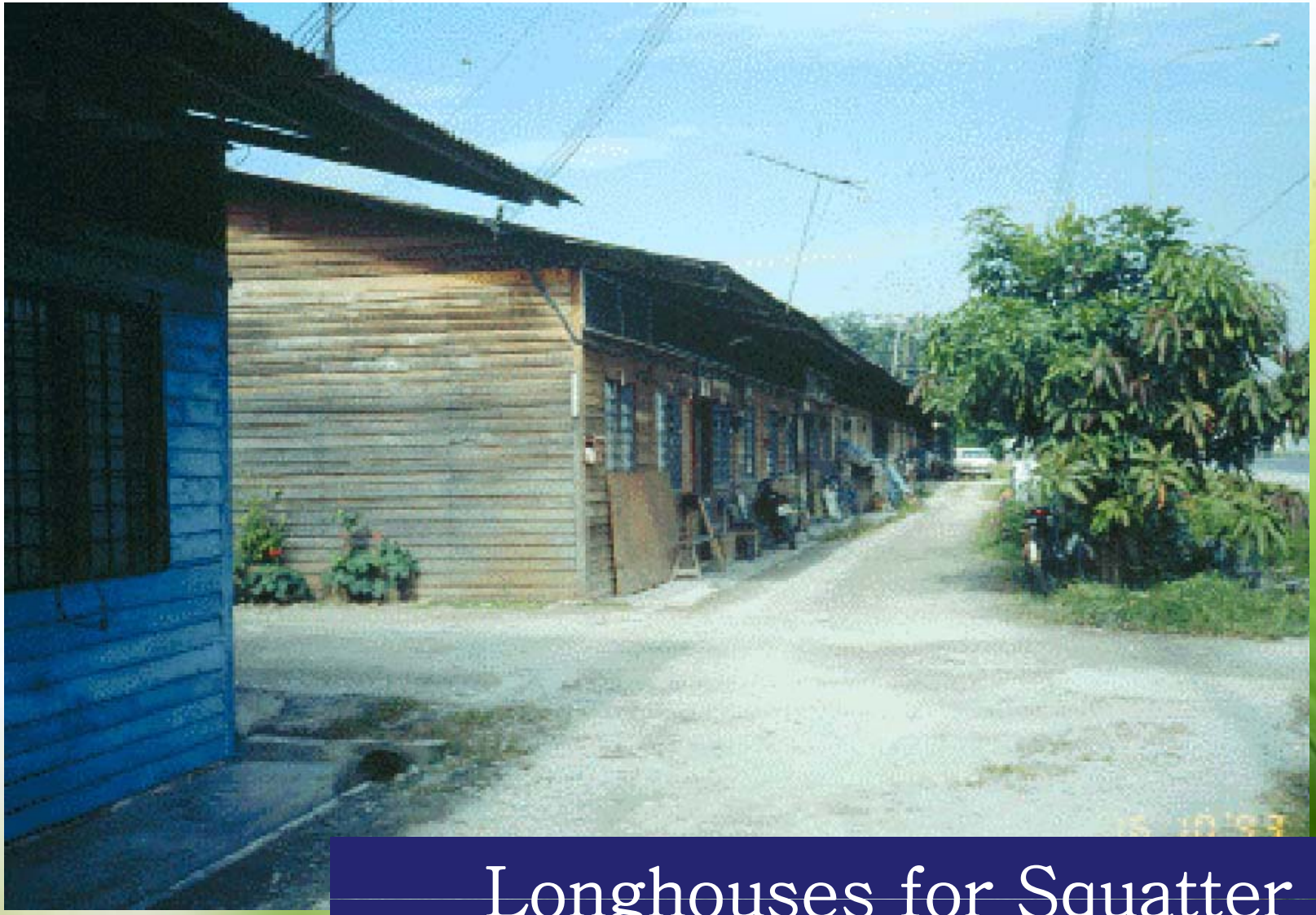


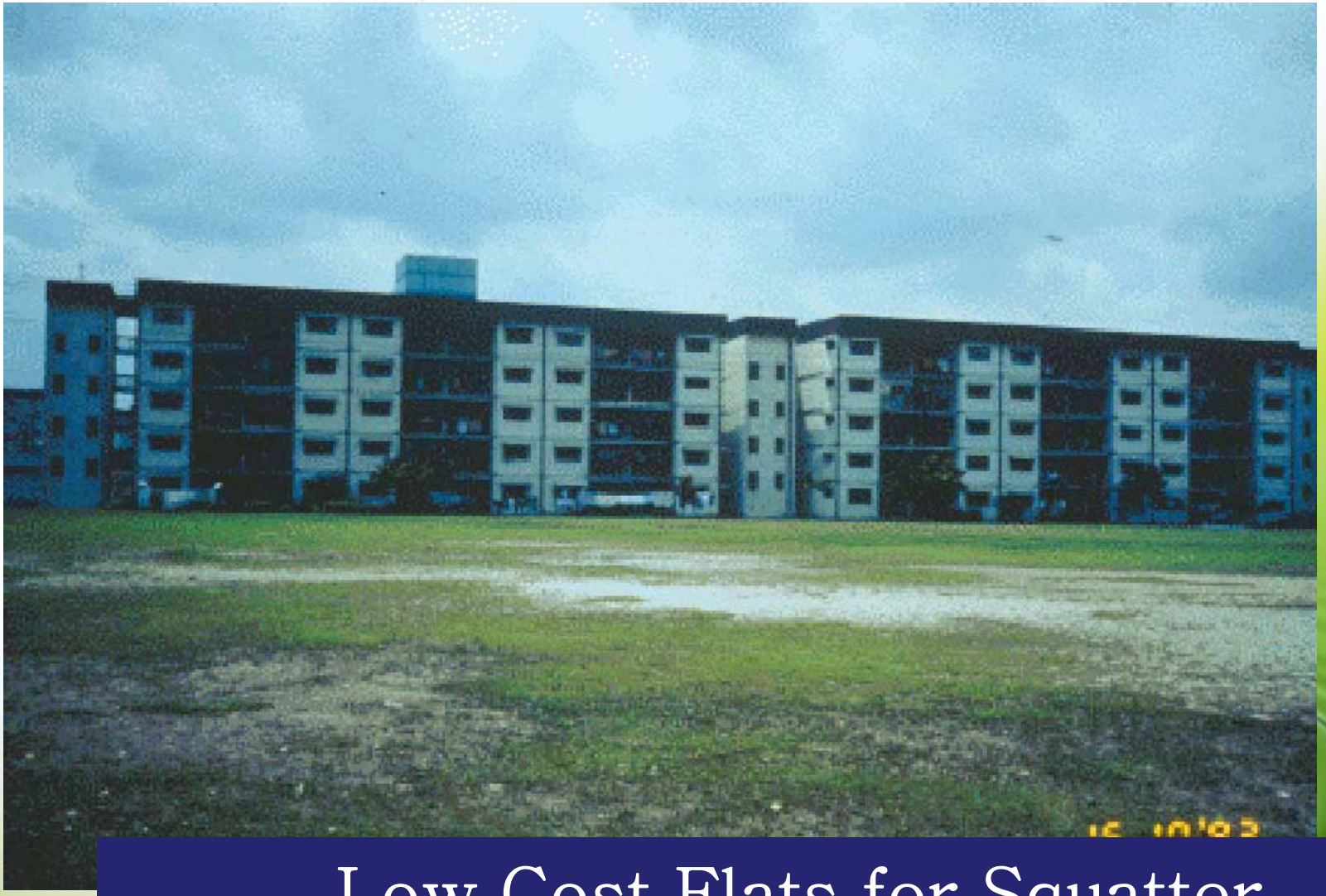
FIGURE. 1 - TYPICAL PLAN OF RESETTLEMENT WITH LINEAR ARRANGEMENT

RESETTLEMENT OF POPULATION



Longhouses for Squatter Resettlement

RESETTLEMENT OF POPULATION



Low Cost Flats for Squatter Resettlement

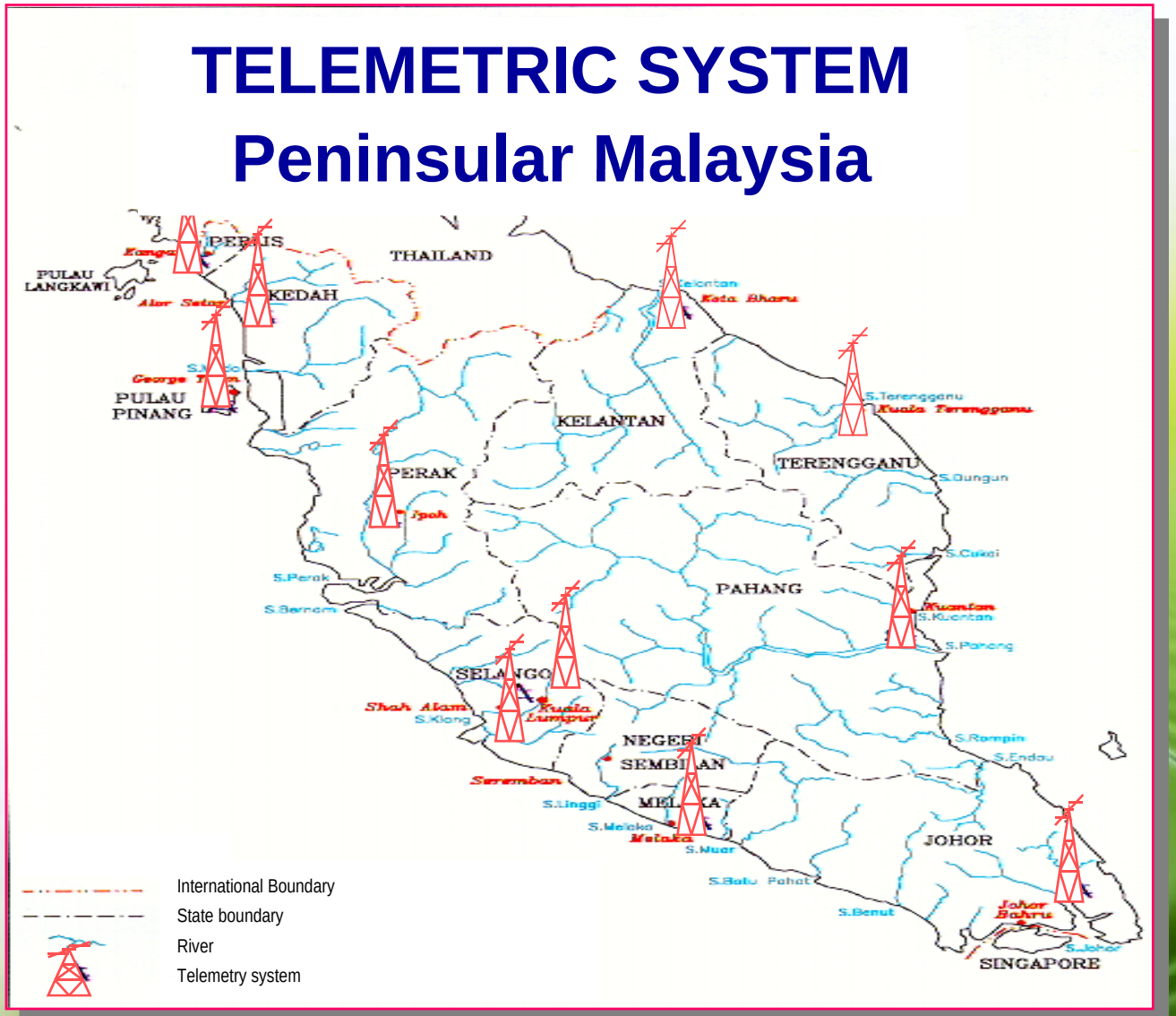
FLOOD PROOFING

EXAMPLE:

BUNDING THE AREA WITH WALL
SO THAT THEAREA IS NOT
SUBMERGED DURING FLOOD

FLOOD FORECASTING & WARNING SYSTEM

TELEMETRIC SYSTEM
Peninsular Malaysia



FLOOD FORECASTING & WARNING SYSTEM

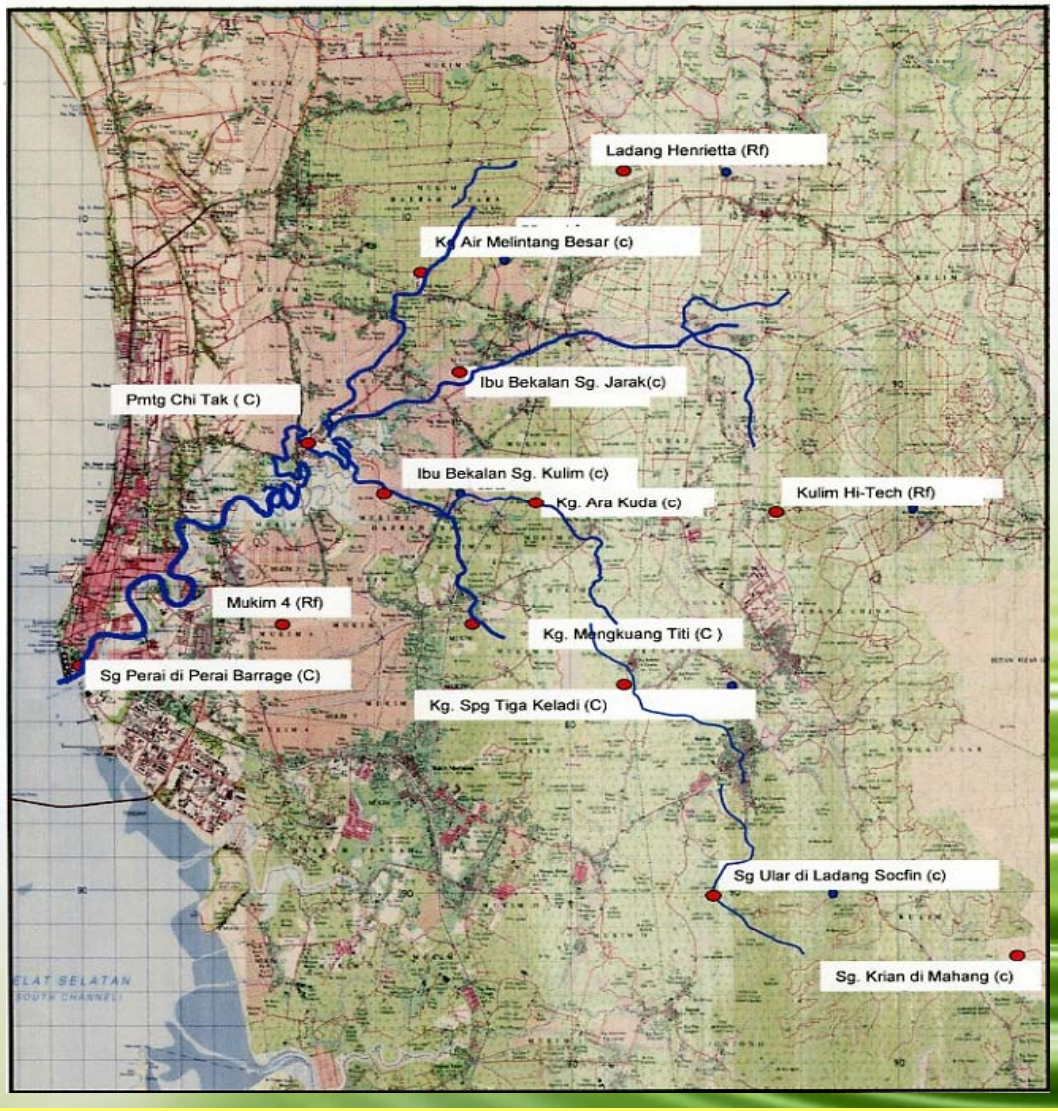
Flood Warning Board

FLOOD FORECASTING & WARNING SYSTEM

Flood Warning Siren

FLOOD FORECASTING & WARNING SYSTEM

Location of Proposed Telemetry Station



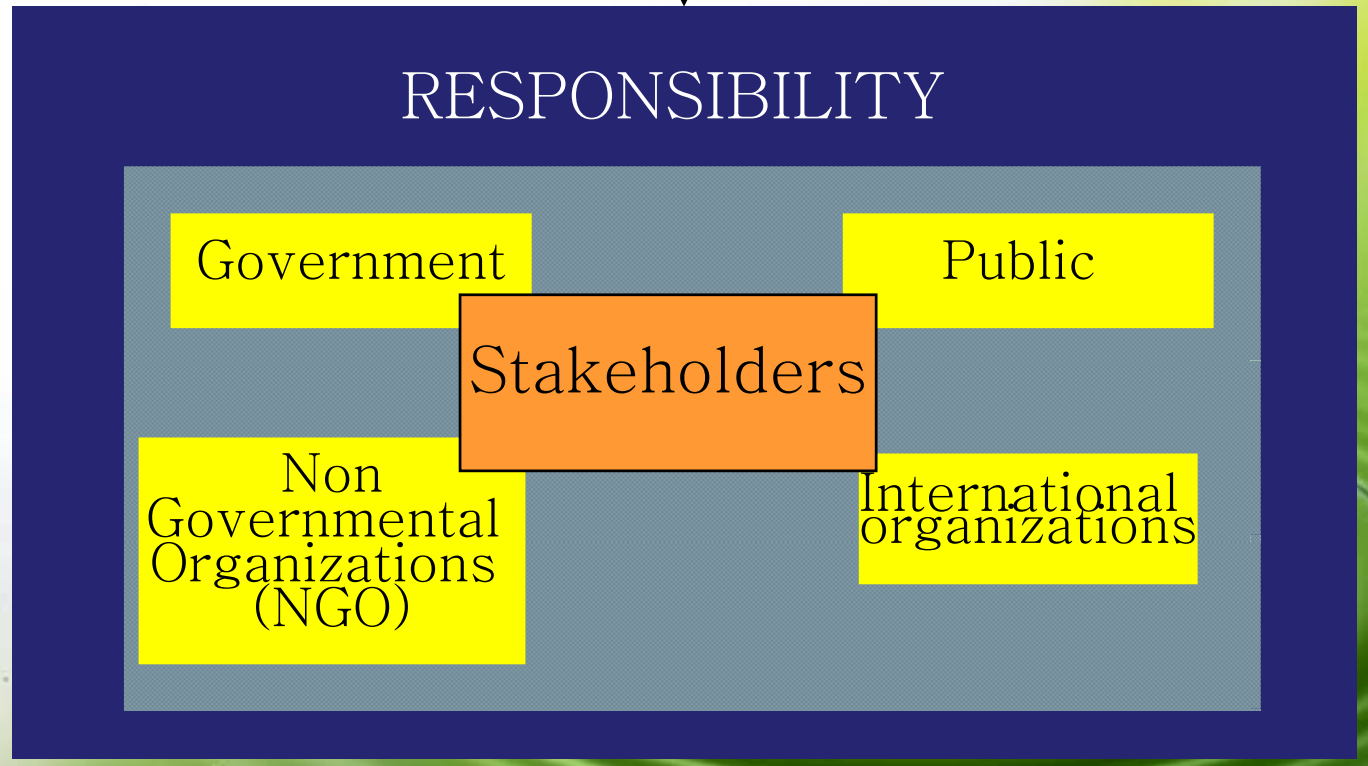
CONCLUSIONS

Damage to infrastructures & Loss of Life

Can Be Minimized

CONCLUSIONS

To ensure the impact of water related disaster is reducing.



CONCLUSIONS

ACTION

To implement
Flood Management Program in
Comprehensive and Integrated Manner

To Establish Flood Mitigation
With
Organized Approach & Proper Action

So that ;

Floods Can Be Mitigated & Reduced

And.....

Damage to infrastructures & Loss of Life Can Be Minimized