German Chamber of Commerce

Republic of South Africa

Stormwater management –Planning for Municipalities

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Stormwater Flooding Disasters in South Africa:

Floods are the most frequently recorded disasters in southern Africa. South Africa is no exception and experienced 77 major floods between 1980 and 2010, costing the lives of at least 1,068 people.

Many severe floods have occurred since 2010 with losses of life, livelihoods and extensive damage to built infrastructure.

1908 Port Elizabeth flood

1987 South Africa floods

2010–2011 Southern Africa floods

2016 Johannesburg flood

2019 Durban Easter floods

2022 KwaZulu-Natal floods

2023 South Africa floods

2023 Western Cape floods

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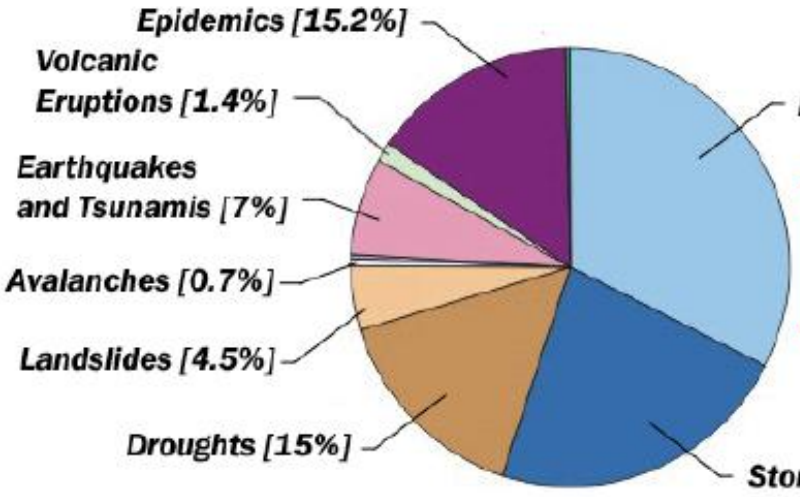
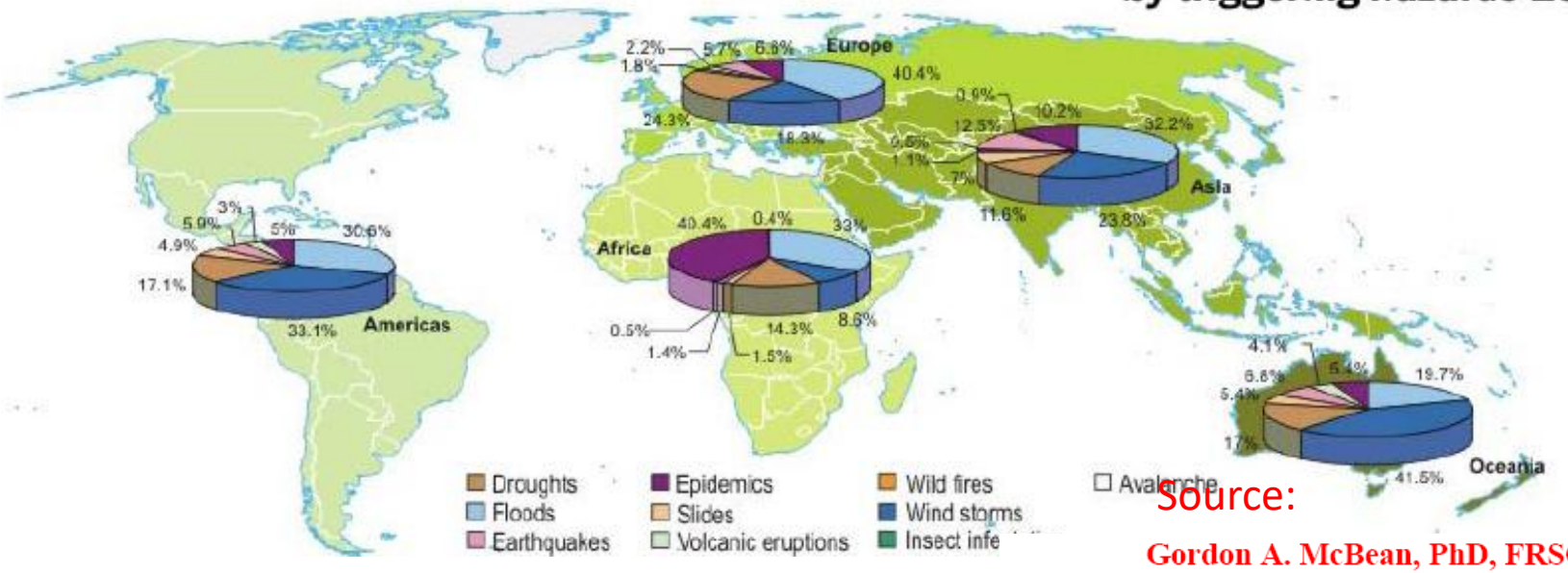


World distribution of disasters: by triggering hazards 1994-2003

Floods, storms, droughts, …>75%

Regional distribution of disasters by triggering hazards 1994-2003



Source:

Gordon A. McBean, PhD, FRSC
Institute for Catastrophic Loss Reduction
The University of Western Ontario, Canada

Current Management of Stormwater Challenges

- Severe financial constrains
- Reactive rather than proactive management
- Lack of maintenance of stormwater infrastructure
- Increased urbanisation causing higher runoff
- Under capacity drainage networks
- Blocked kerb inlets ,culverts , bridges

Current Stormwater control challenges

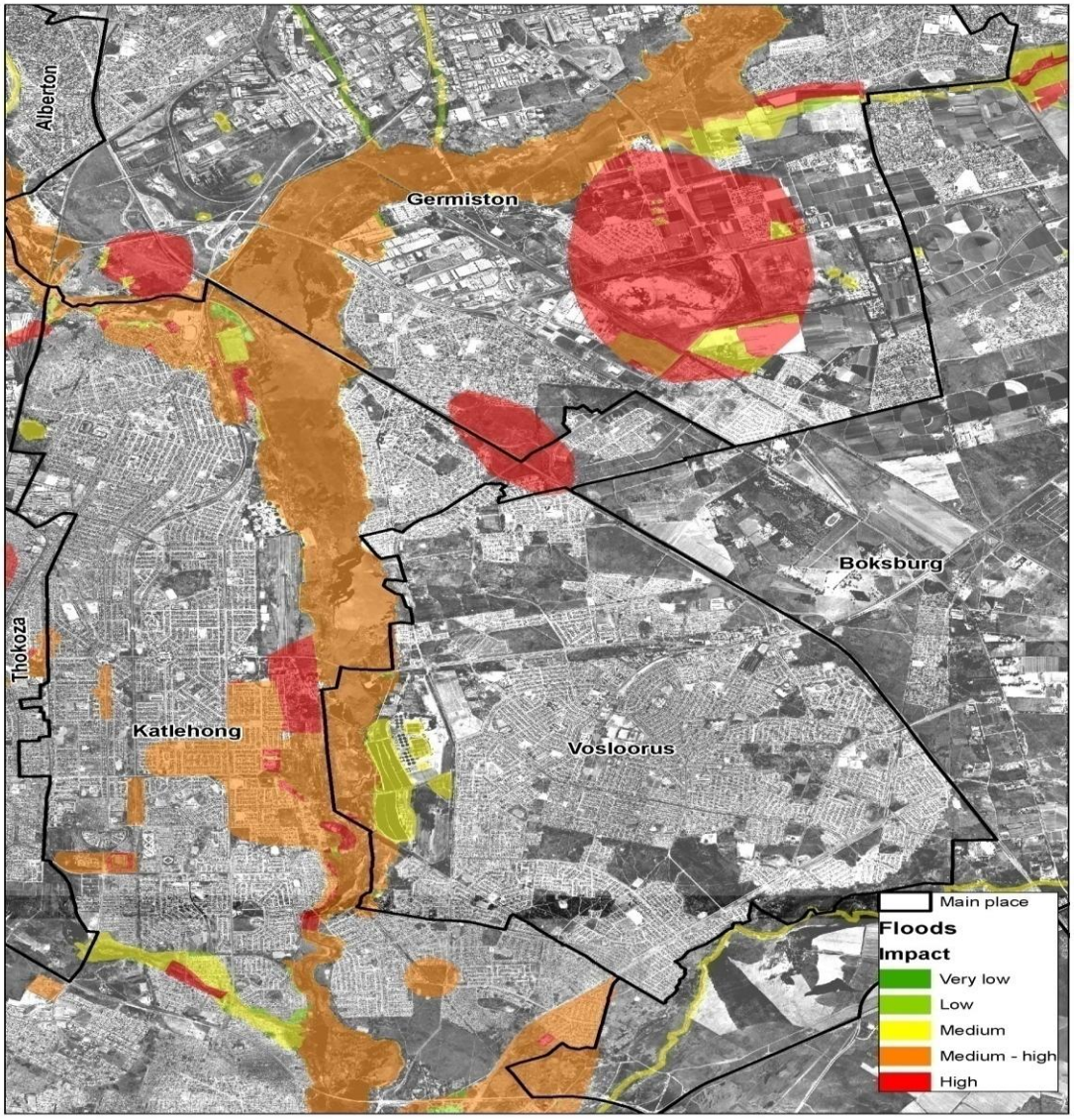
Current Management of Stormwater –Regulations and guidelines

- *SARF – Road Drainage manual*
  - Major watercourses and drainage networks – 1:50 to 1:100 year design floods
  - Urban minor drainage networks handle 1:5 year event
  - Major urban drainage networks handle 1:25 year event
- *Municipal Development Guidelines in Flood Prone Areas*
  - No developments inside the 1:100 year floodplains
  - Flood attenuation of new developments
  - Lack of By-laws enforcing development control

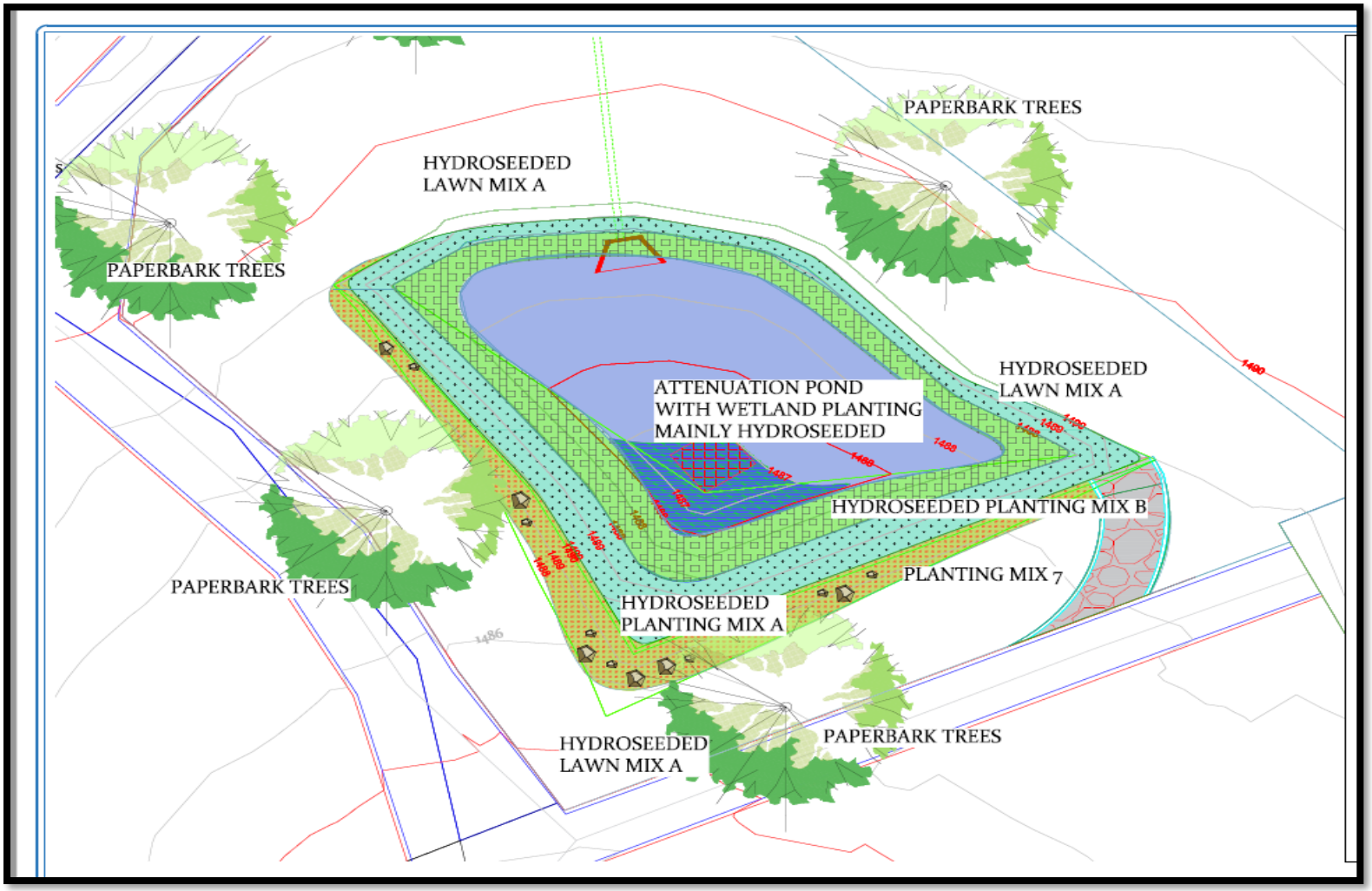
Current Management of Stormwater –Practical design interventions and Planning

- Application of Best Management Practices (BMP's)
  - ➢Structural BMPs
    - Food protection Levees along Flood prone areas
    - Implementation of Flood attenuation basins
    - Improved kerb inlets designs
    - Debris fins at culvert ,bride crossings
  - ➢Non-structural BMPs
    - Stormwater master plans
    - Flood risk assessments
    - Prioritisation of problem areas and upgrading measures
    - Prioritised maintenance plans

Practical design interventions and planning examples –Flood Risk assessment

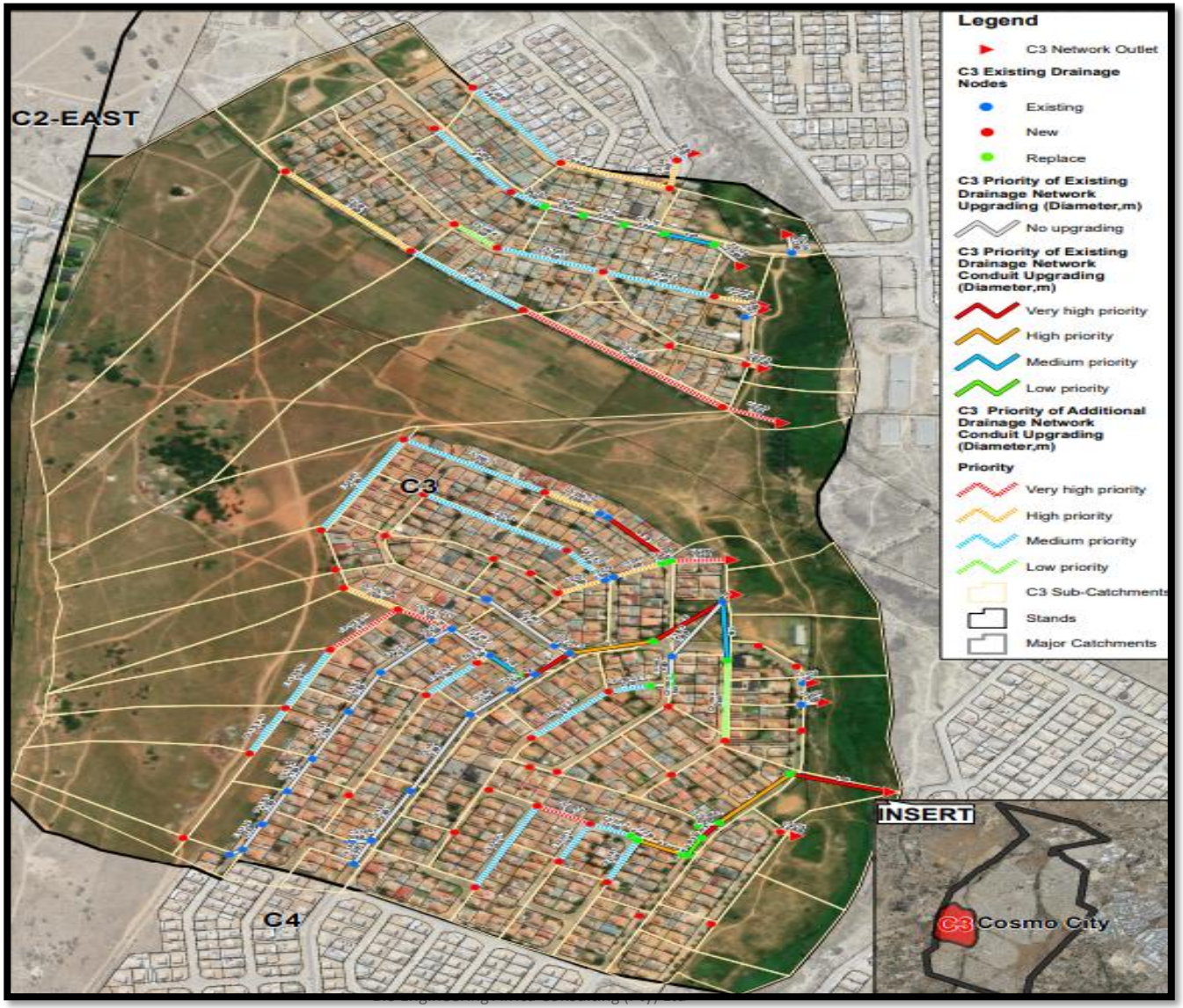


Practical design interventions and planning examples –flood attenuation dams



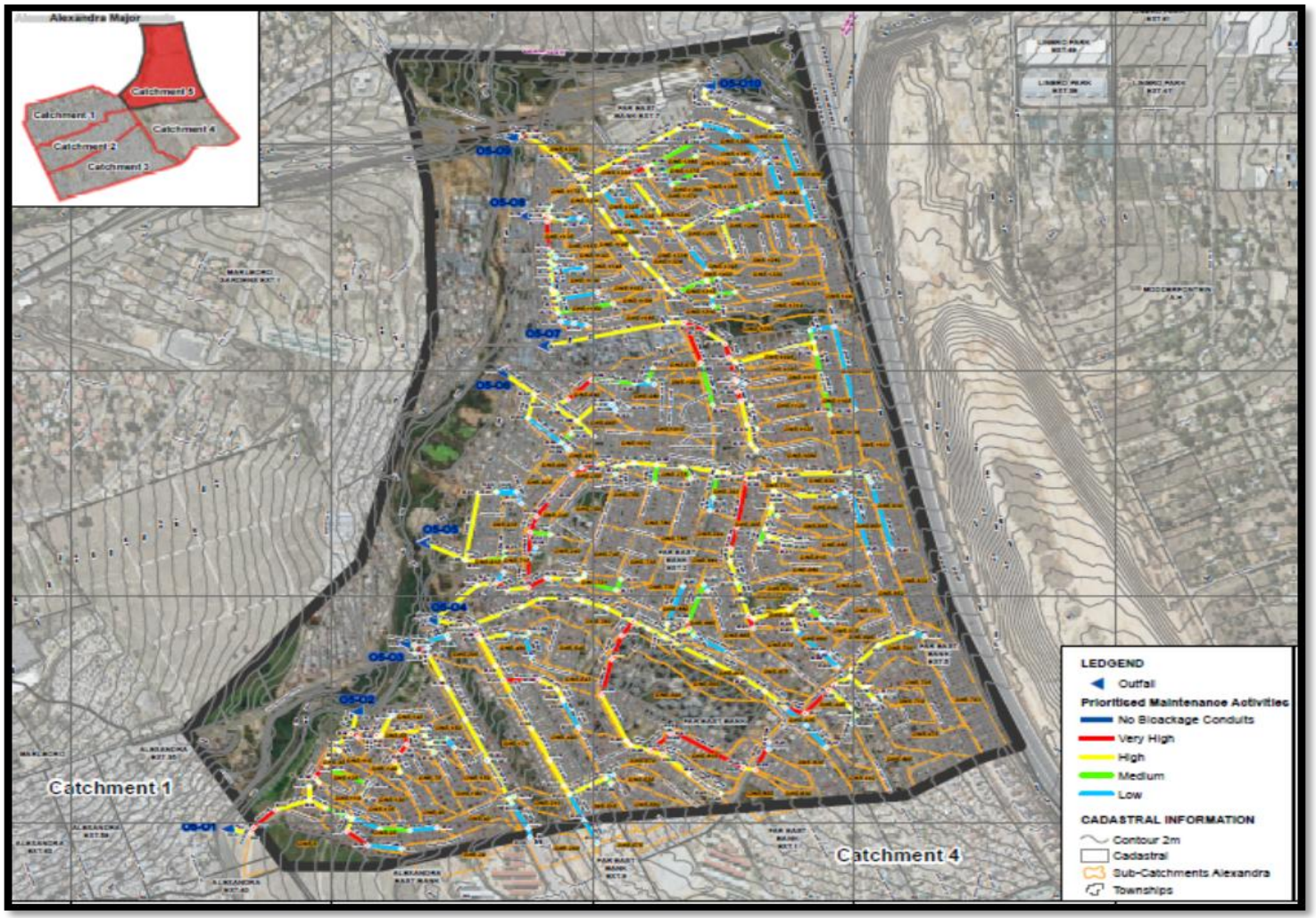
Practical design interventions and planning examples –flood attenuation dams

Practical design interventions and planning examples –drainage network upgrading Prioritization



Practical design interventions and planning examples –drainage network Prioritized maintenance program

Practical design interventions and planning examples –drainage network Prioritized maintenance program



Practical design interventions and planning examples –Debris Fins

Practical design interventions and planning examples –Debris Fins

Improved Stormwater management – Climate change resilience

- Regional climate change studies best practice guidelines
  - Increased storm rainfall depth by 10-15 %
  - Impact assessment of climate change storm rainfall and quantification of design flows
  - Increased drainage network size

Thank You and Discussion

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https://www.bioengineeringafrica.co.za/?cmp_bypass=85a8e4192e375e7bd19ac7265ee10f5f