Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

Innovative Traffic Data Sources for Africa

Megan Bruwer: Civil Engineering

23 May 2024

Innovative Traffic Data Sources for Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Presentation Overview

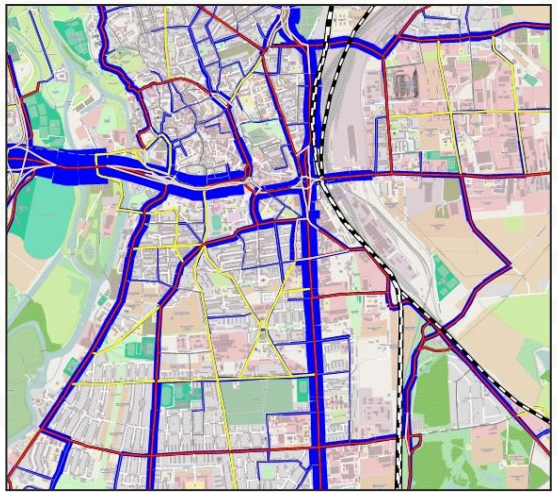
- Transportation research at the Department of Civil Engineering
- Stellenbosch Smart Mobility Lab
- Floating car data
- Research: FCD applications in South Africa
  - FCD in the context of South Africa
  - Congestion measurement
  - Pothole detection

Transportation Engineering

Stellenb
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

Research Environments

Road safety	Traffic engineering	Geometric design	Transportation planning
Intelligent Transport Systems (ITS)	Sustainable transport solutions	Transport in developing countries	Public- and Para-transit



SSML
STELLENBOSCH SMART MOBILITY LAB

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together
sonke siya phambili
saam vorentoe

Research unit for mobility studies, focus on ITS and sustainability

- **Established in 2014** in response to education and training needs of transport industry in South Africa
- Three components of the SSML programme:
  - Engineering education (undergrad and postgrad)
  - Research
  - Industry training
- Multidisciplinary approach
- Developing country context
- Industry link (research needs and partnerships)

SANRAL BUILDING SOUTH AFRICA THROUGH BETTER ROADS
STELLENBOSCH MUNISIPALITEIT • UMASIPALA • MUNICIPALITY
tomtom
PTV GROUP
syntell
transport
Department: Transport
REPUBLIC OF SOUTH AFRICA

Research Model: Test-bed environment

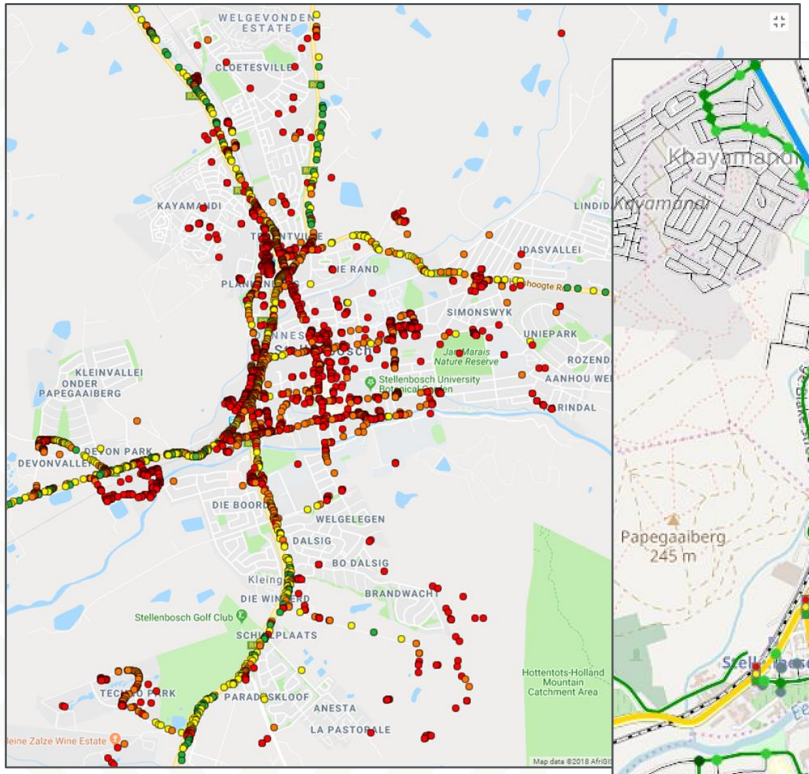
Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together
sonke siya phambili
saam vorentoe

Real-world laboratory

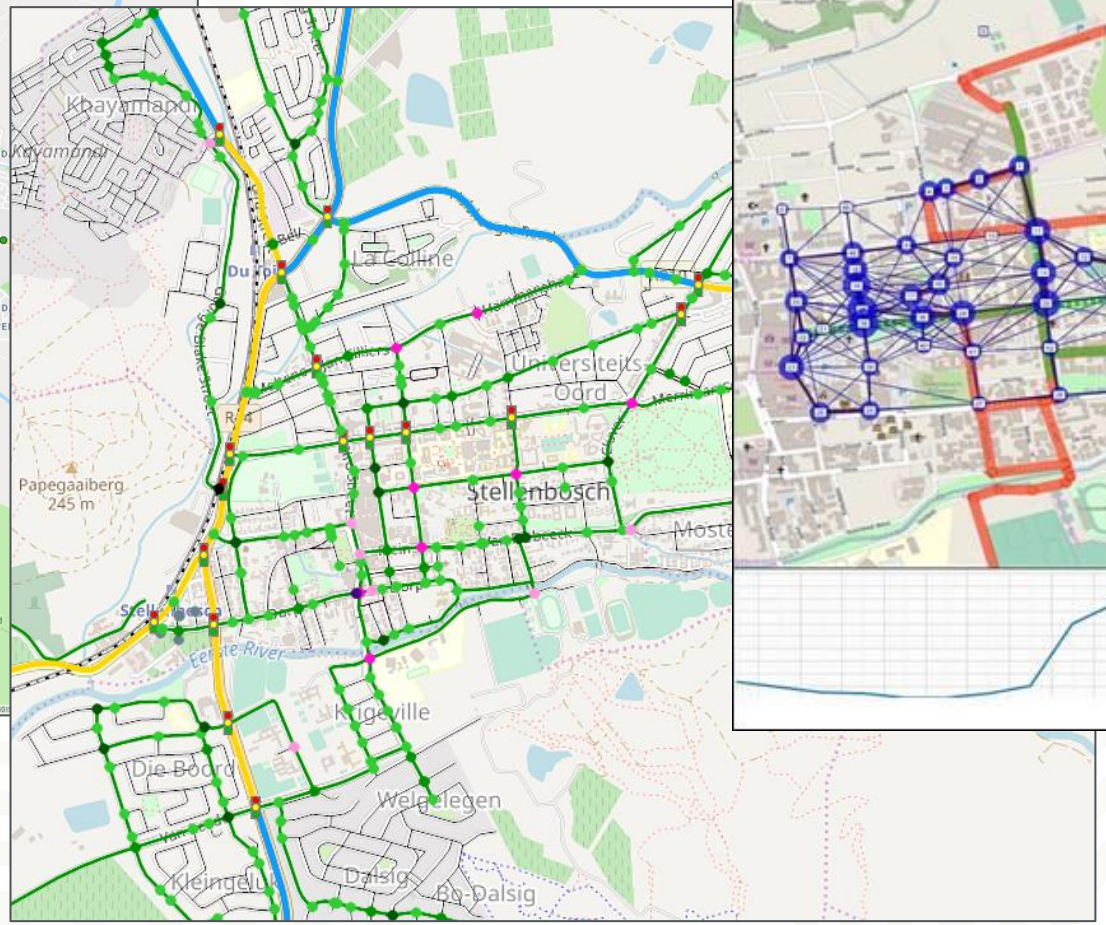
WHY Stellenbosch?

- Clear urban boundary and separation from other urban centres
- BIG traffic problems
- Student centre (research AND early-uptakers)
- Good interaction with local municipality
- Close to Cape Town

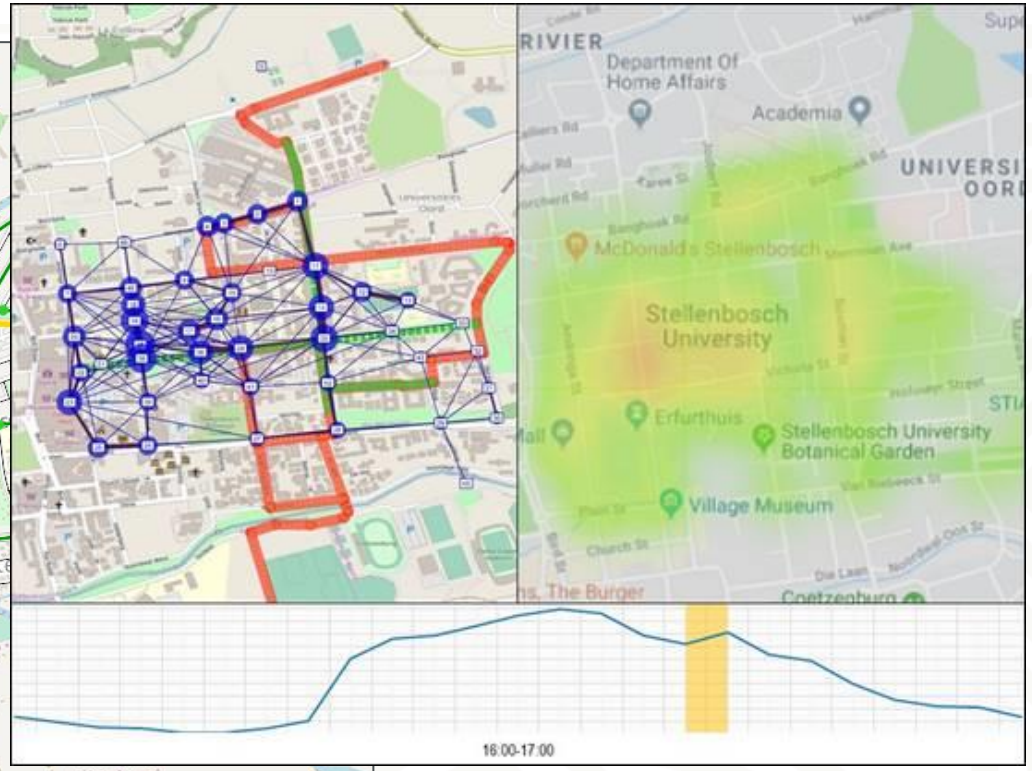
SSML traffic data sources



Local telematics companies



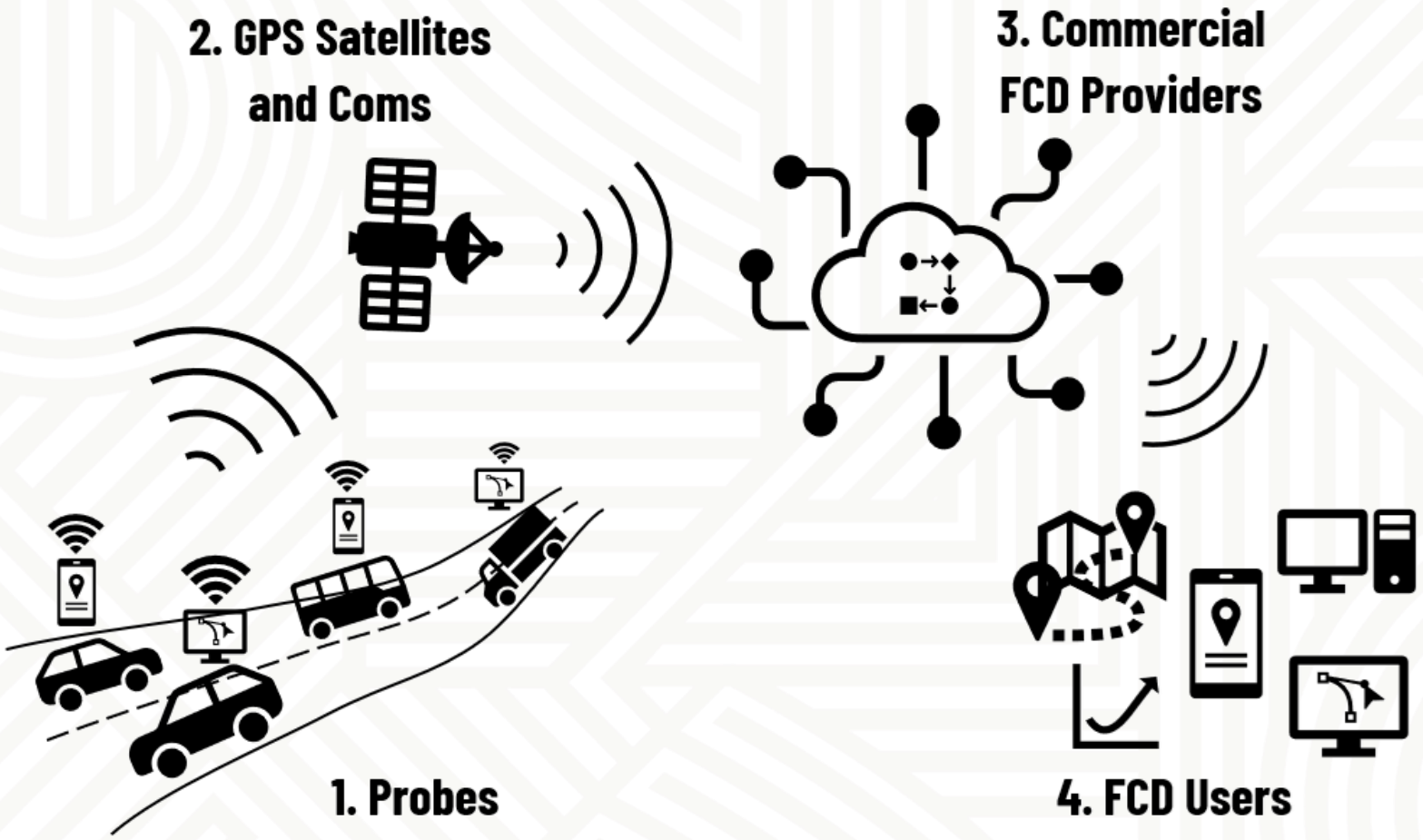
Collaborative traffic monitoring with Stellenbosch Municipality



Short-term technology-based data collection strategies

SSML traffic Data Sources

Commercial FCD



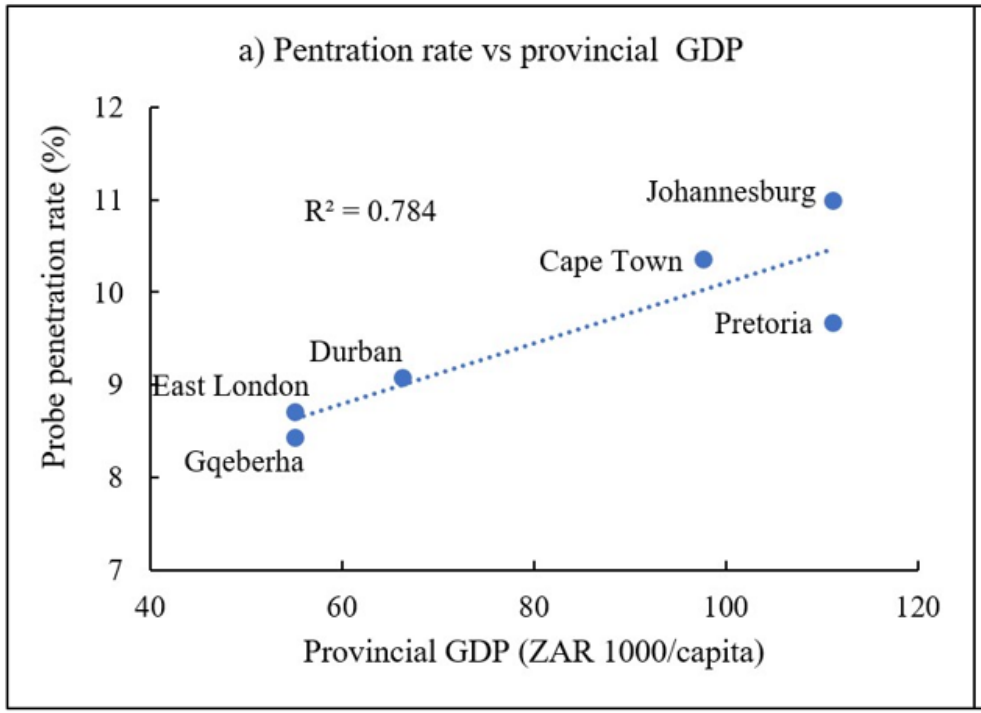
tomtom

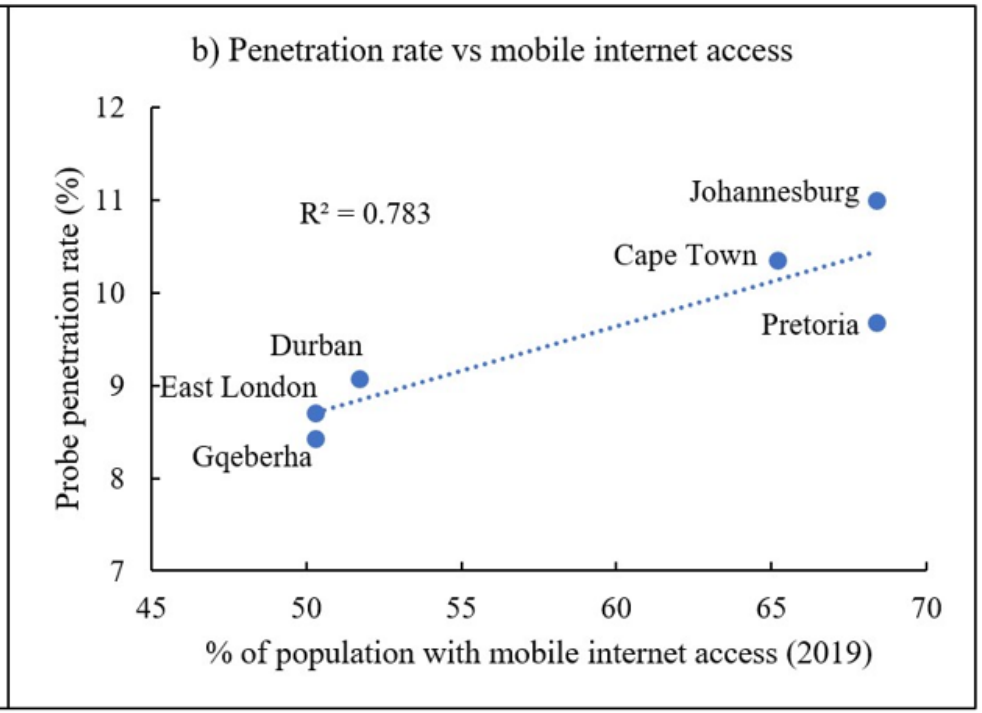
ALTECH NETSTAR
Leaders in Vehicle Tracking & Recovery

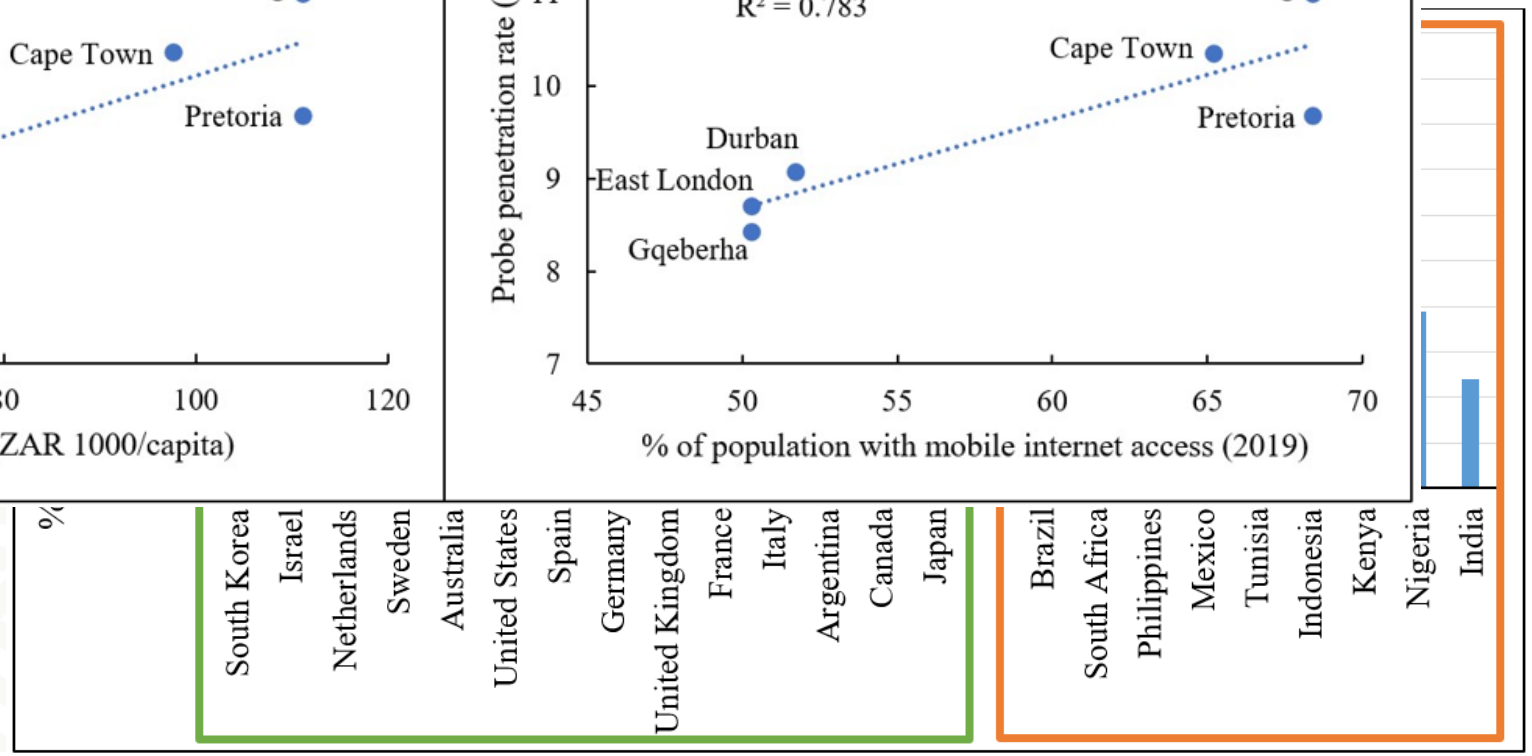
Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

FCD in the context of South Africa





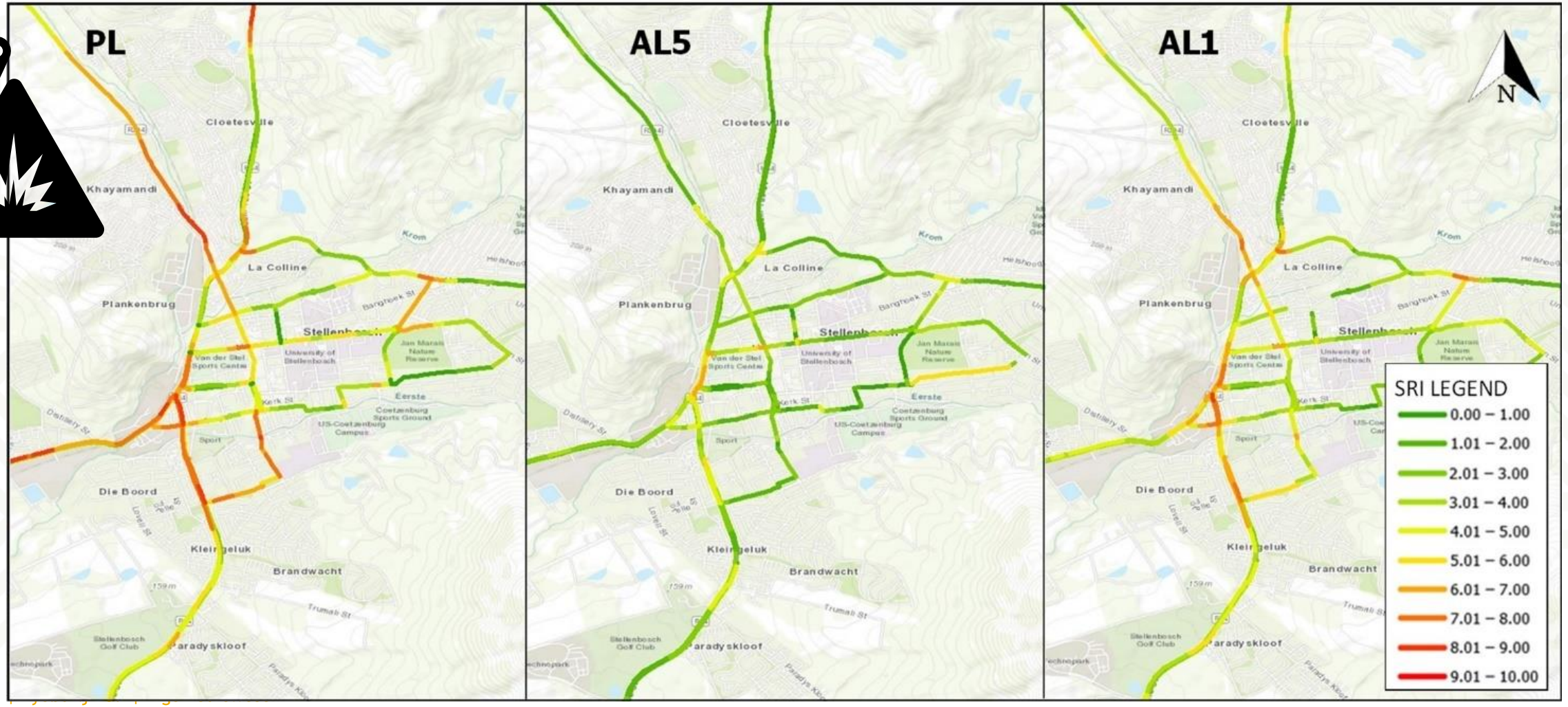


Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Congestion measurement

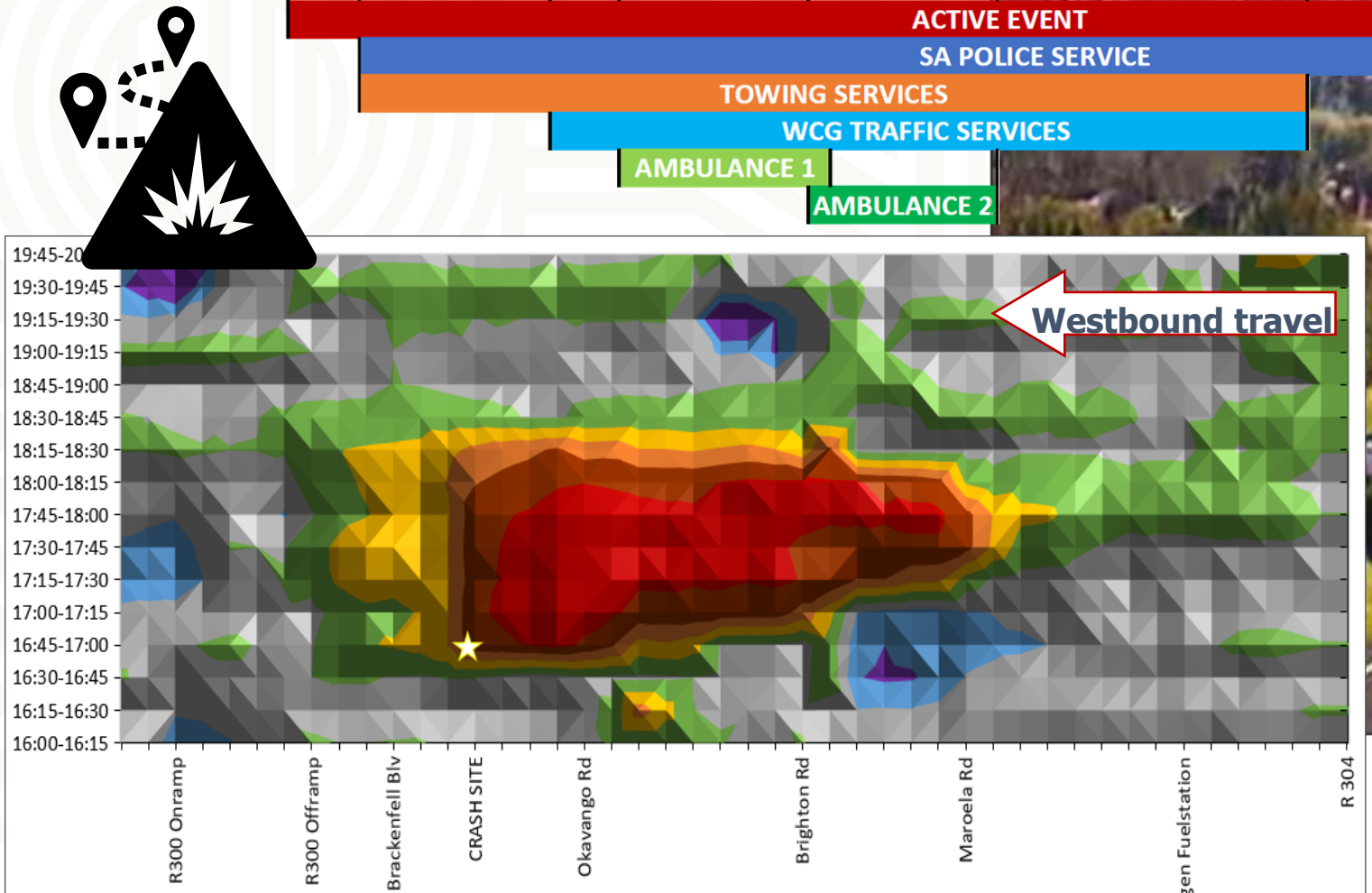
$$SRI = \left[1 - \frac{u}{u_{FFS}}\right] \times 10$$

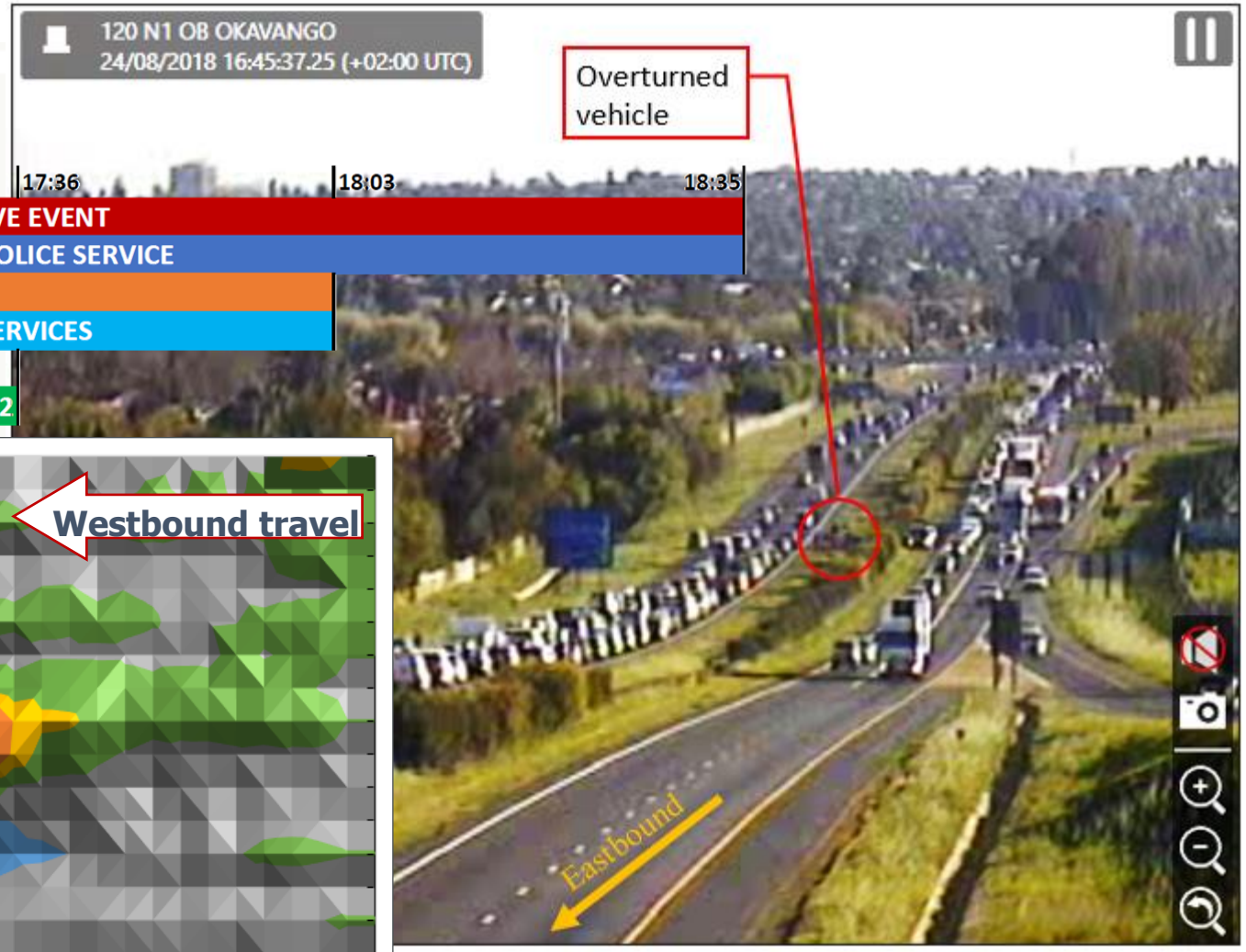


Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Congestion measurement





$$(SRI_{NR})_{a,b} = \left[1 - \frac{(u_I)_{a,b}}{(u_T)_{a,b}}\right] \times 10$$

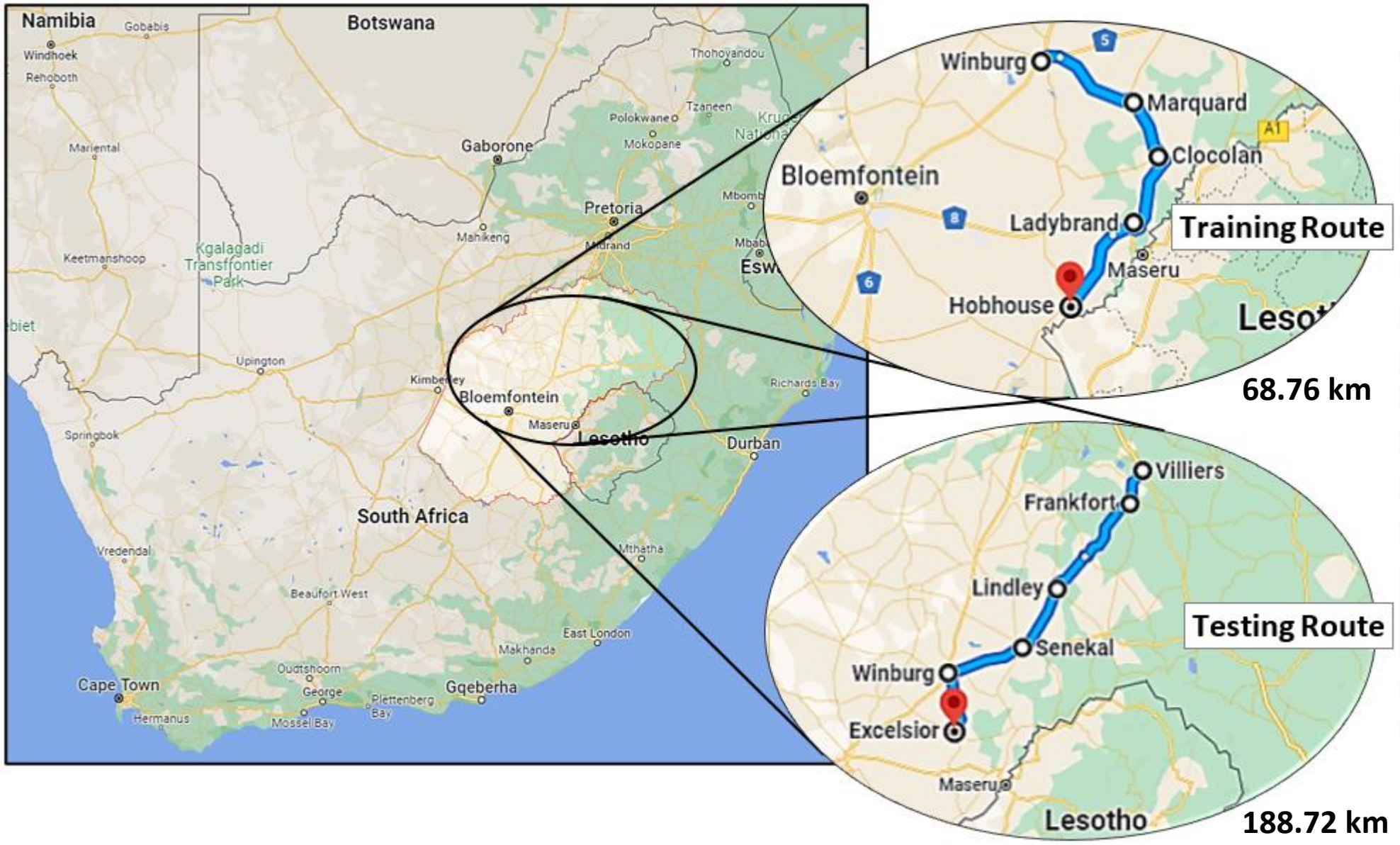
Research: FCD applications in South Africa

Pothole detection

Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

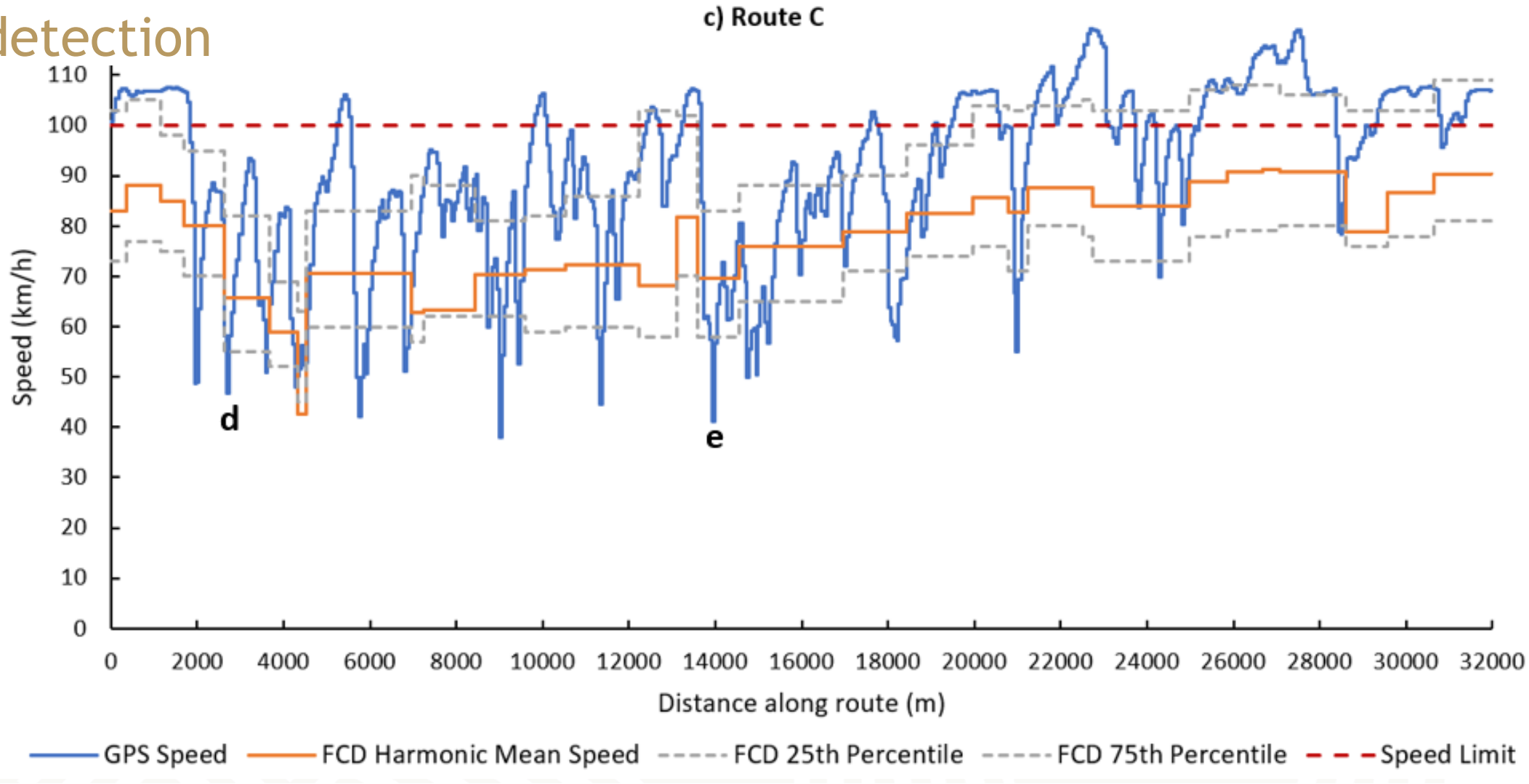
Pothole det



Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together
sonke siya phambili
saam vorentoe

Pothole detection



Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Pothole detection

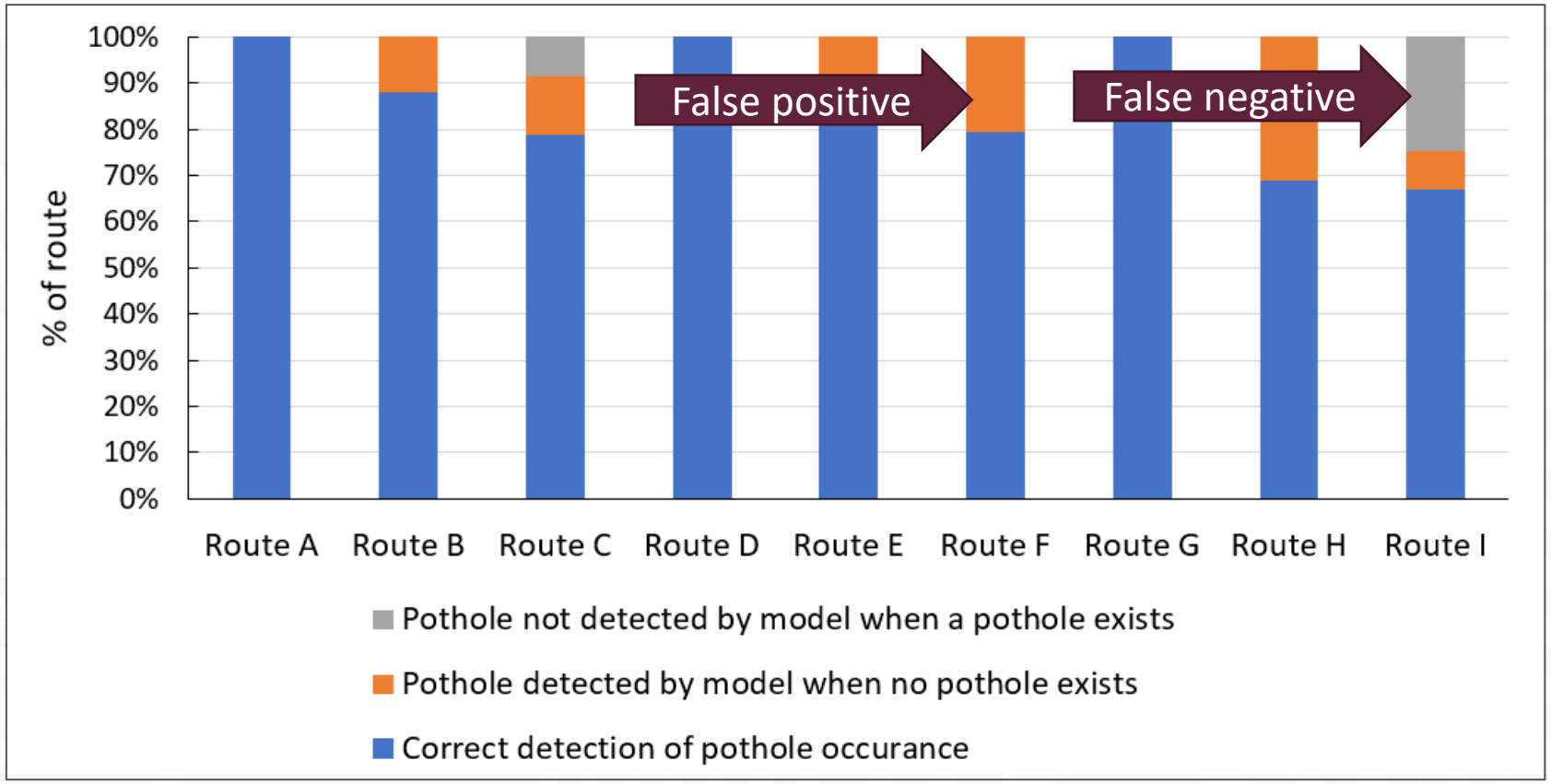


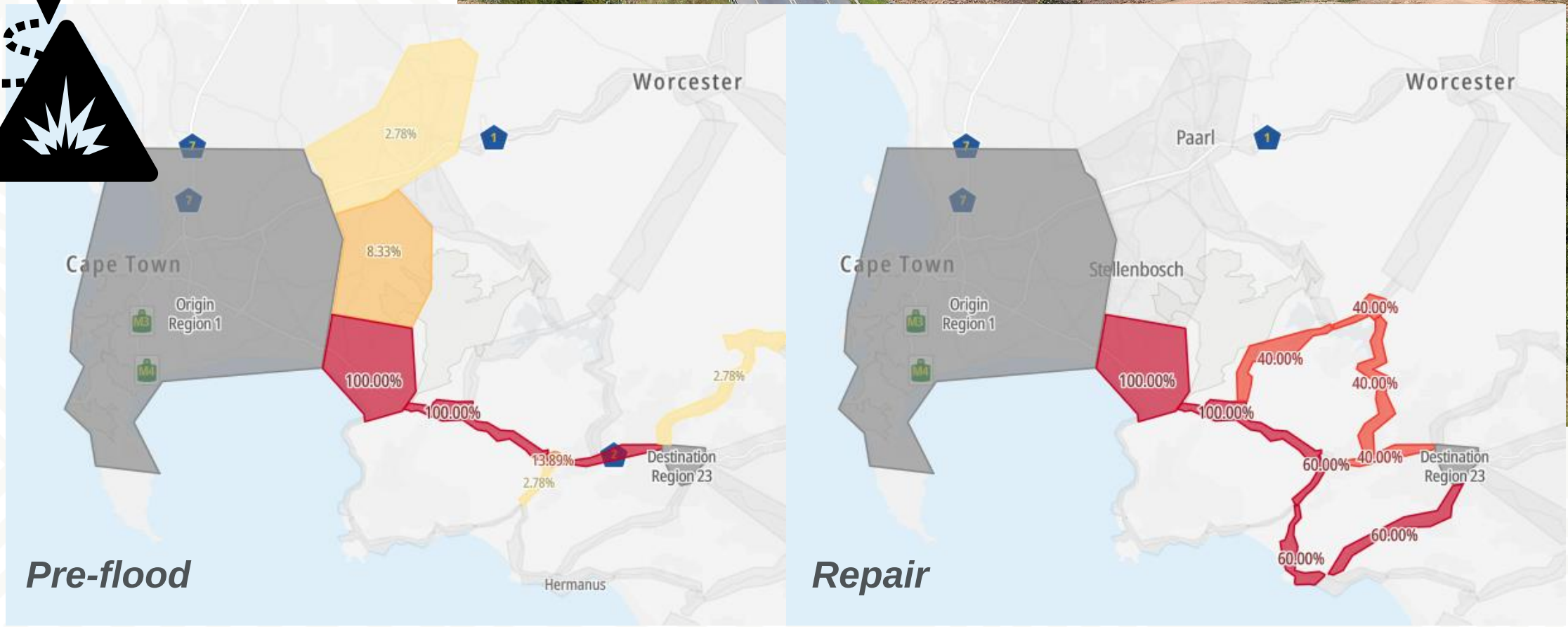
Table 8-2: Analysis of pothole detection for segments with potholes

	E	F	H	I	Average
CORRECT outcome: pothole detected	100%	100%	100%	83%	96%
INCORRECT outcome: no pothole detected	0%	0%	0%	17%	4%

Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Natural Disasters



Research: FCD applications in South Africa

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT
forward together sonke siya phambili saam vorentoe

Other use-cases for FCD in traffic monitoring

Calibration of traffic models

Real-time detection of traffic incidents

Real-time input to traffic control

Measuring Level of Service of transport facilities

Monitoring speed control strategies

Measuring levels of accessibility

Observation of routes and areas avoided by drivers

Estimation of traffic volumes

CIVIL ENGINEERING

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

forward together
sonke siya phambili
saam vorentoe

FOLLOW US!

WEBSITE www.civeng.sun.ac.za

INSTAGRAM @civilengSU

FACEBOOK @CivilEngineeringStellenboschUniversity