



South African Pavement Design Method (SAPDM) Revision

RPF Feedback 12th November 2008

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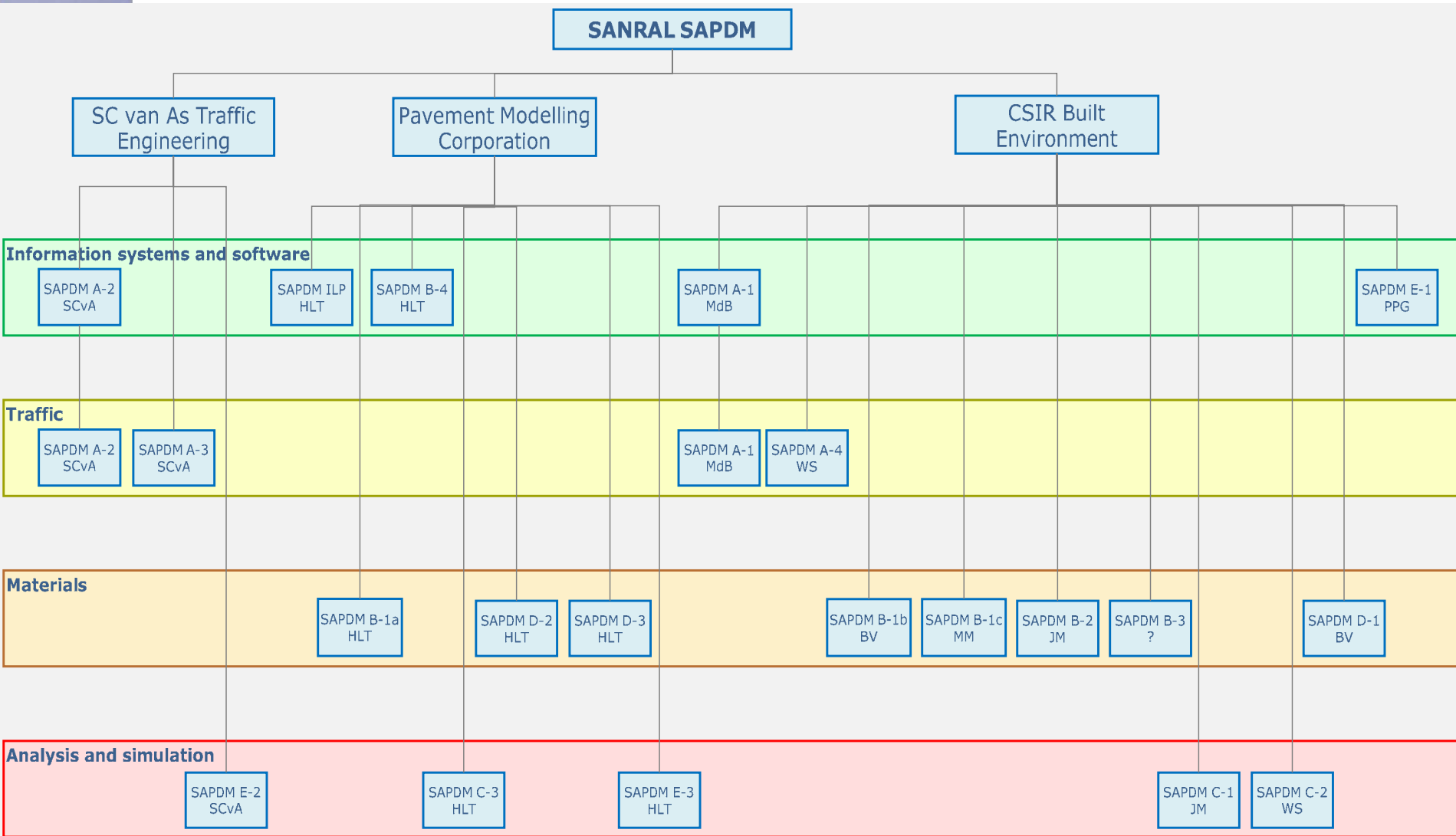
Historical Overview – SAPDM Revision

- Process initiated at RPF - **May 2005**
- R&R framework - **November 2005**
- **Pavement Performance Information System (LTPP)**
 - Material Classification Concept
 - Pavement Number Concept (PN)
 - 50 Projects Completed – **February 2008**
 - 15 Stabilized Projects Currently Being Added
- **Mechanistic-Empirical Analysis System (MEAS)**
 - Phase 1 – Develop Detailed Project Briefs – **November 2006**
 - Phase 2 - Inception Phase (22 Projects) – **July 2007**
 - Peer Review – Phase 2 Reports – **November 2007**
 - Additional SANRAL Requirements – **December 2007**
 - Consider the impact of in-service operating conditions on the pavement design input
 - Functional performance simulation must be an integral part of the pavement design process (i.e. roughness, cracking, potholes, rut depth, etc)
 - A comprehensive cost-benefit analysis procedure must form part of the final deliverable
 - different life-cycle strategies
 - including costs and benefits for road users and road authorities
 - Utilise HDM-4 models to fast-track the process



SAPDM Revision – Current Status

- Appointment of Main Service Providers – September 2008



SAPDM – Investigation Process Flow

Available Data



- PMS/available data:
- Operating conditions
 - Geometry
 - Pavement structure
 - Materials
 - Traffic
 - Mechanical survey
 - Visual condition

- Information systems:
- Traffic volume and axle load
 - Contact stress
 - Environment
 - Materials

Project Level
Visual Assessment

Data validation and processing:
Analysis sections
Uniform sections

Risk Profile:
Road Category
Traffic
Climate
Client

Statistical Test Criteria:
Prescribed list of tests
Prescribed Frequency

Project Level Testing:
DCP, Test Pits, etc

Data Validation and Analysis:
PMS
Lab Results
DCP Analysis
Deflection Analysis
...

Material Classification:
Uniform Sections

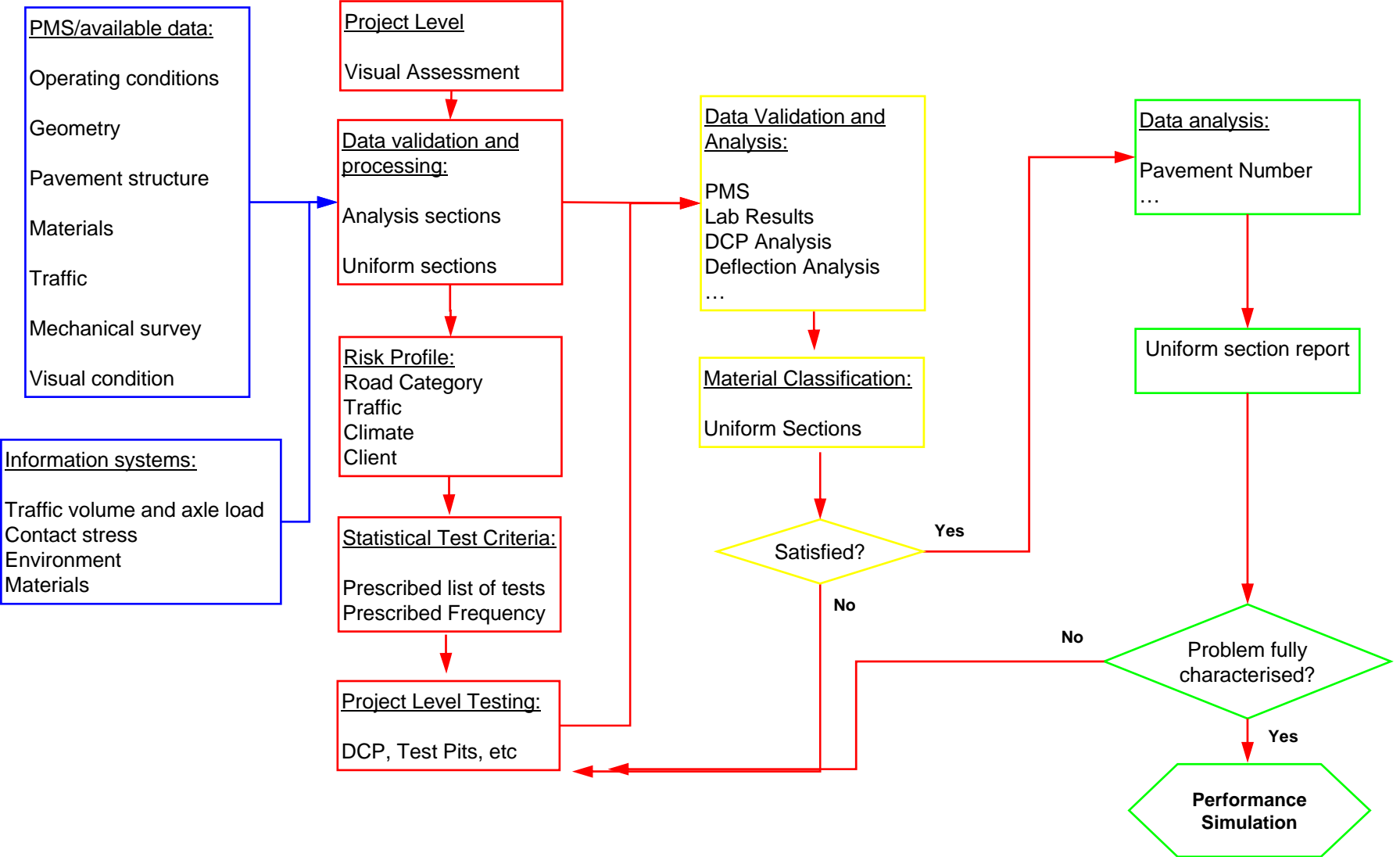
Satisfied?

Data analysis:
Pavement Number
...

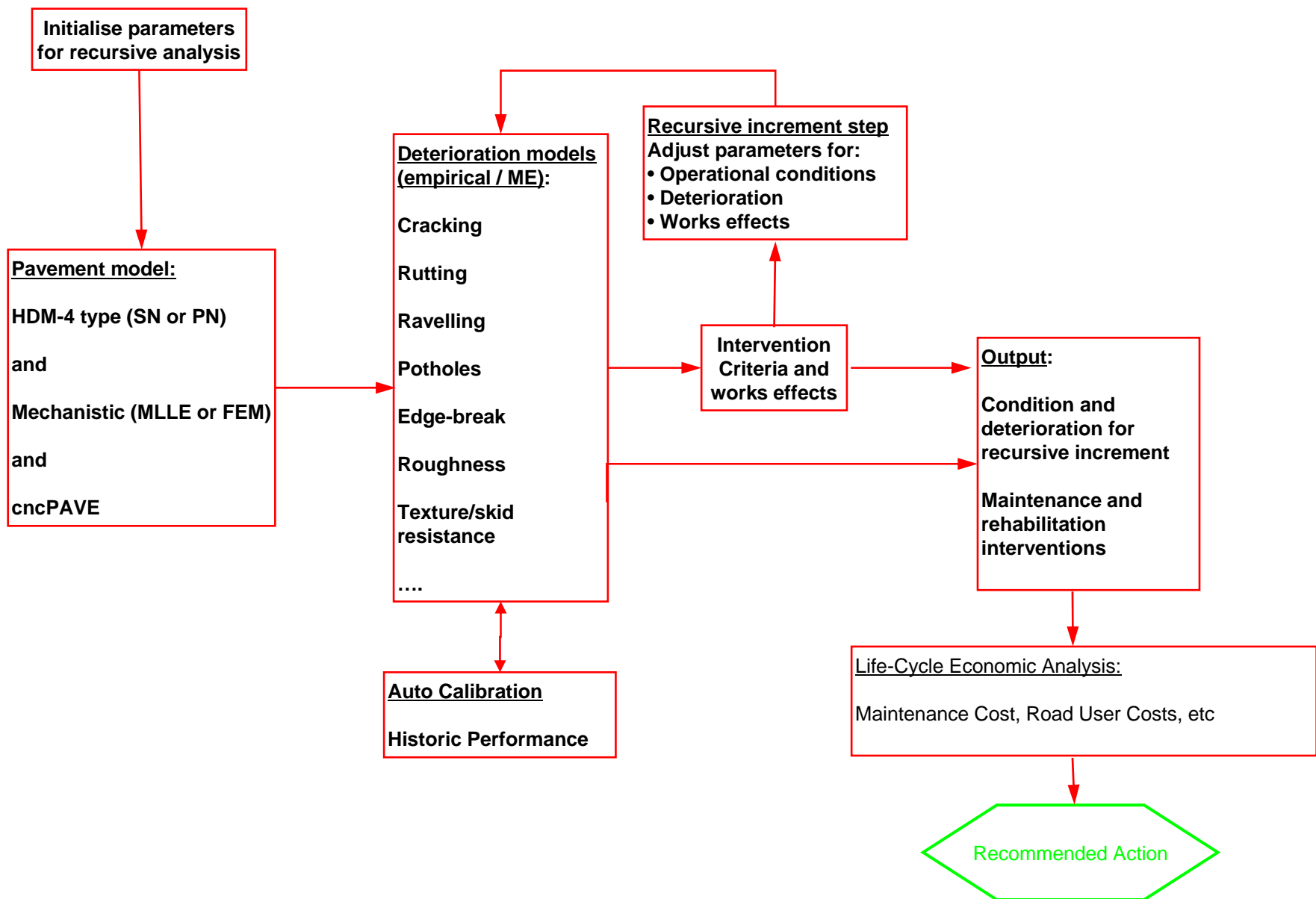
Uniform section report

Problem fully characterised?

Performance Simulation



SAPDM – Performance Simulation Process Flow

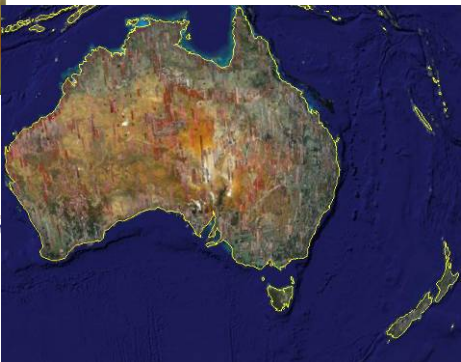
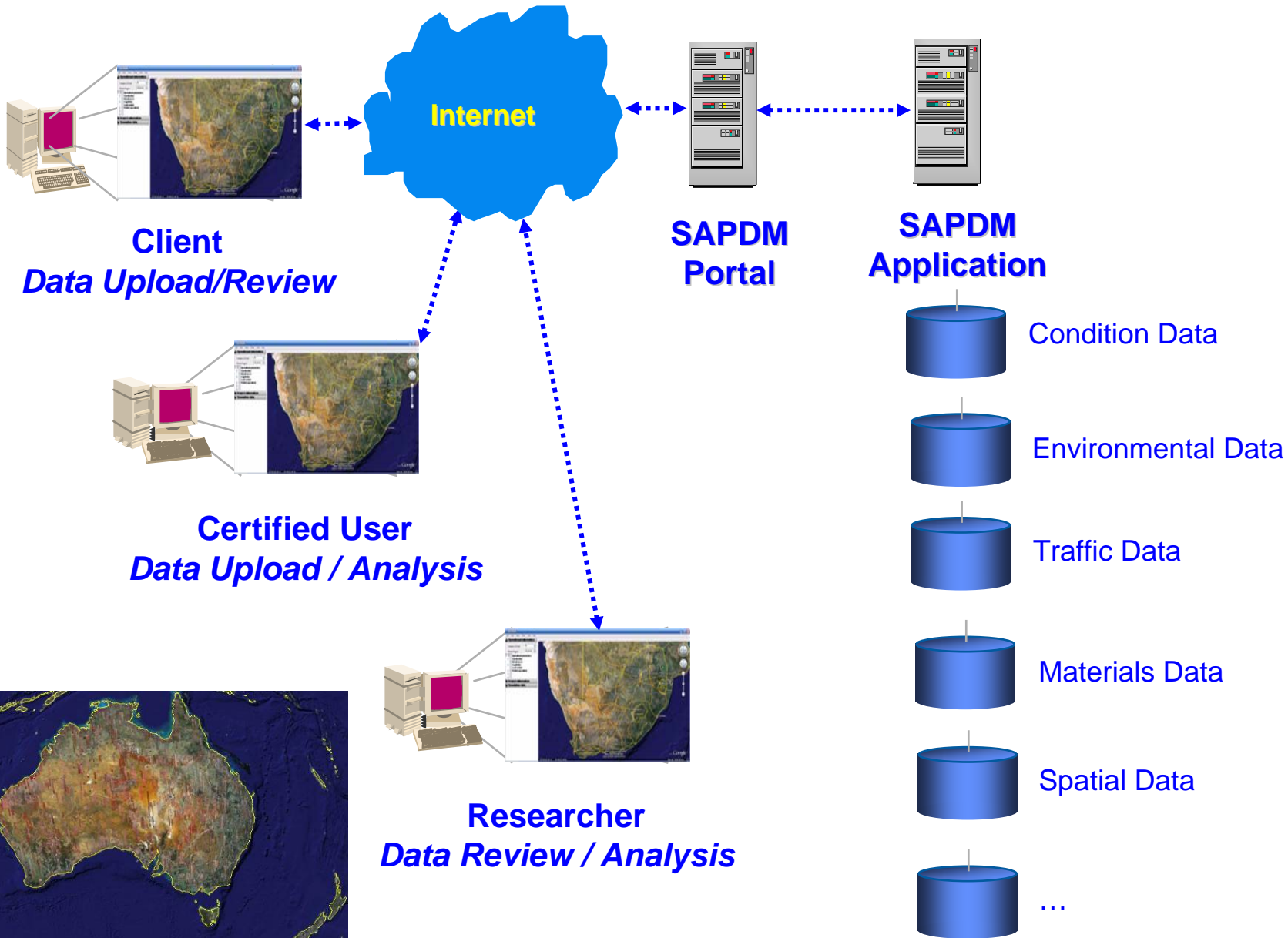


What-if? examples



- What-if the legal axle load is increased?
 - How does the axle load histogram shift?
 - How does the E80/HV change?
- What-if the legal axle load is not enforced?
 - How does the axle load histogram change?
 - How is the relation between traffic volume and vehicle loading (E80/HV) affected?
- What-if everybody runs on overloaded and under-inflated tyres?
 - How is the contact stress shape affected?
 - What is the magnitude of the edge-stresses?
- What-if the grading of the crushed stone is slightly out of spec?
 - How is the compaction potential affected?
 - How is the shear strength affected?
- What-if construction quality control is neglected?
 - How is the field density distribution affected? How far does the tail extend below the spec?
 - How is the binder content distribution affected?
- What-if we recycle?
 - What is the binder content distribution?
- What-if maintenance is neglected?
 - How is the pavement moisture content affected by unsealed cracks?
 - How is the pavement moisture content affected by poor drainage?
- What-if we provide shoulders or increase the lane width?
 - How is the pavement moisture content affected?

SAPDM – Information Flow



SAPDM – Operational Information

SAPDM

File Edit View Tools Add Help

▲ Operational information

Category of Road: B

Climate Region: Moderate

Operational parameters

- Construction
- Maintenance
- Legislation
- Load control
- Vehicle operations
-
-

▼ Project information

▼ Simulation data

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Eye alt 1834.20 km





SAPDM – Project Information

SAPDM

File Setup Import View Reports Analysis Help

Operational information

Project information

Project
C:\ProPADS\W1-26\W1-26.ppd

Start Km: 0.8

End Km: 51.15

Sections

Name	Start (M)	End (M)
Section 1	800	2600
Section 2	2600	5600
Section 3	5600	15200
Section 4	15200	22000
Section 5	22000	51150

Add Define Remove

Lanes

- NB1
- NB2
- SB1
- SB2

Add LHS Add RHS Define

Wheel path: Between

Simulation data

0.8Km 5.6Km

Section 1 Section 2

40 AG
150 G2
200 C4
150 G7
150 G9
in situ subgrade

40 AG
150 C3
150 C3
150 G7
150 G9
in situ subgrade

Km 2.463 Lane NB1



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For Help, press F1



SAPDM – Simulation Data

SAPDM
File Setup Import View Reports Analysis Help

Operational information
Project information
Simulation data

Inputs

- Traffic
 - Traffic Volume Adjustment Factors
 - Monthly Adjustment
 - Vehicle Class Distribution
 - Hourly Truck Distribution
 - Traffic Growth Factor
 - Axle Load Distribution Factors
 - General Traffic Inputs
 - Number Axles/Truck
 - Axle Configuration
 - Wheelbase
- Climate
- Structure
 - Drainage and Surface Properties
 - Layers
 - Layer 1 - Asphalt concrete
 - Layer 2 - A-1-a
 - Layer 3 - A-2-5
 - Layer 4 - A-7-6
 - Thermal Cracking
 - Distress Potential

0.0Km 5.0Km

2.0 M
1.0 M
0
-1.0 M
-2.0 M

Section 1 Section 2

0 10 20 30 40 50

As-built data
Material Data
Cores
DCP
Visual Assessment
Deflection
Profile
Images

Km 2.463 Lane NB1



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- What Next ?
 - Project teams to finalise by 30 November 2008:
 - Project deliverables
 - Project Budget
 - Project Plan
 - Establish Project Website
 - Continue with Work
- Students (M.Eng and Phd)
 - Employers to assist in making it possible
- Remember this is a 3 year Project !!!