ASSET MANAGEMENT IN AUSTRALASIA

Road Pavement Forum

04/05/2016

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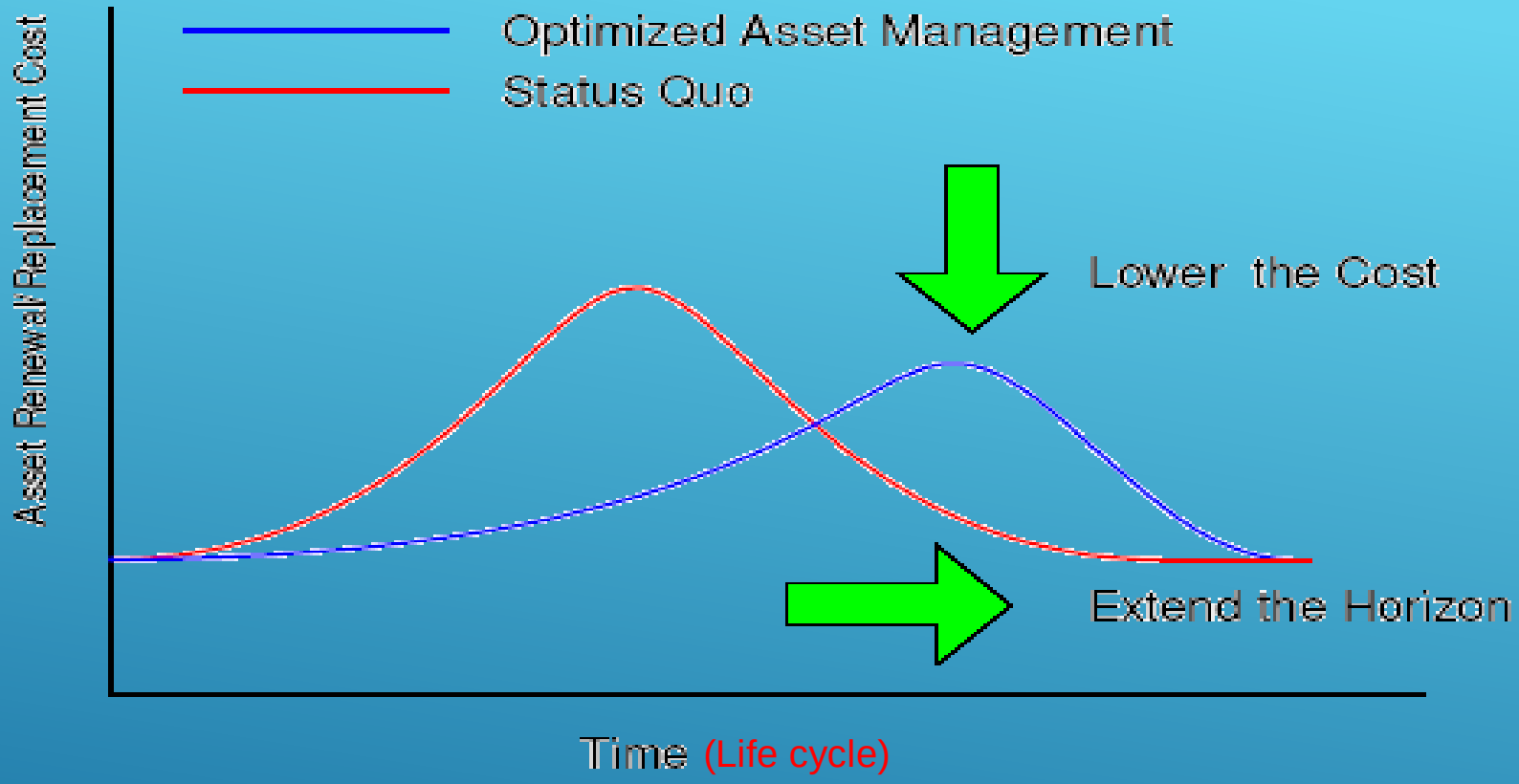
SANRAL

WE'LL COVER -

- Asset Management principles
- Our reason for being…
- NZ & OZ Maintenance scope
- Asset Management practice

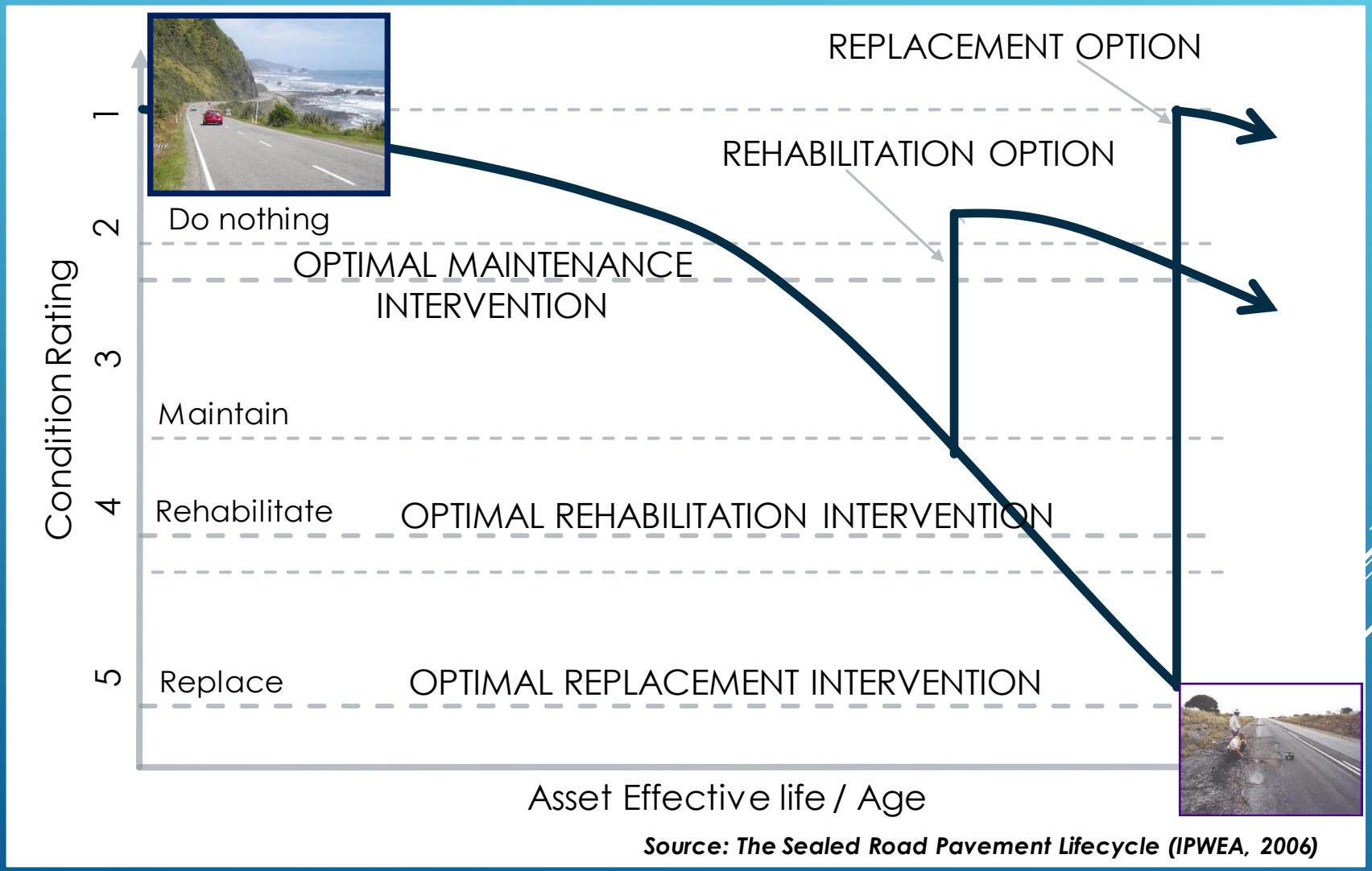
"Asset Management is a systematic process of planning, operating, maintaining, upgrading and replacing assets cost effectively with minimum risk and at the *expected* levels of service over the assets life cycle"

WHAT IS ASSET MANAGEMENT?



ASSET MANAGEMENT AIMS & BENEFITS

Intervention timing



Source: The Sealed Road Pavement Lifecycle (IPWEA, 2006)

ASSET MANAGEMENT

Asset Outputs (LOS)

Decision Making Process

Customer expectations

Asset knowledge

Performance

Cost

Risk

THE REASON FOR BEING….

Are you Customer Focused or Customer Driven?

Customer-*focused*	Customer-*driven*
We think *about* our customers	We think ***like*** our customers
Believe customers *are important*	Know customers are ***our business***
Focus on *internal issues*	Focus on the ***customer's world***
Use information to *change the customer*	Use information to ***change their*** *business*
Do things that *work for the company*	Do things that ***work for*** *the customer*
Staff are *advocates for the company*	Staff are *advocates for* ***the customer***
Decisions are made *without thinking* about the customers.	Customers are ***considered before*** *decisions* are made.

Table 6.1- Customer-focused versus customer driven from NAMS Manual Creating Customer Value from Community Assets

CUSTOMER AND STAKEHOLDER EXPECTATIONS

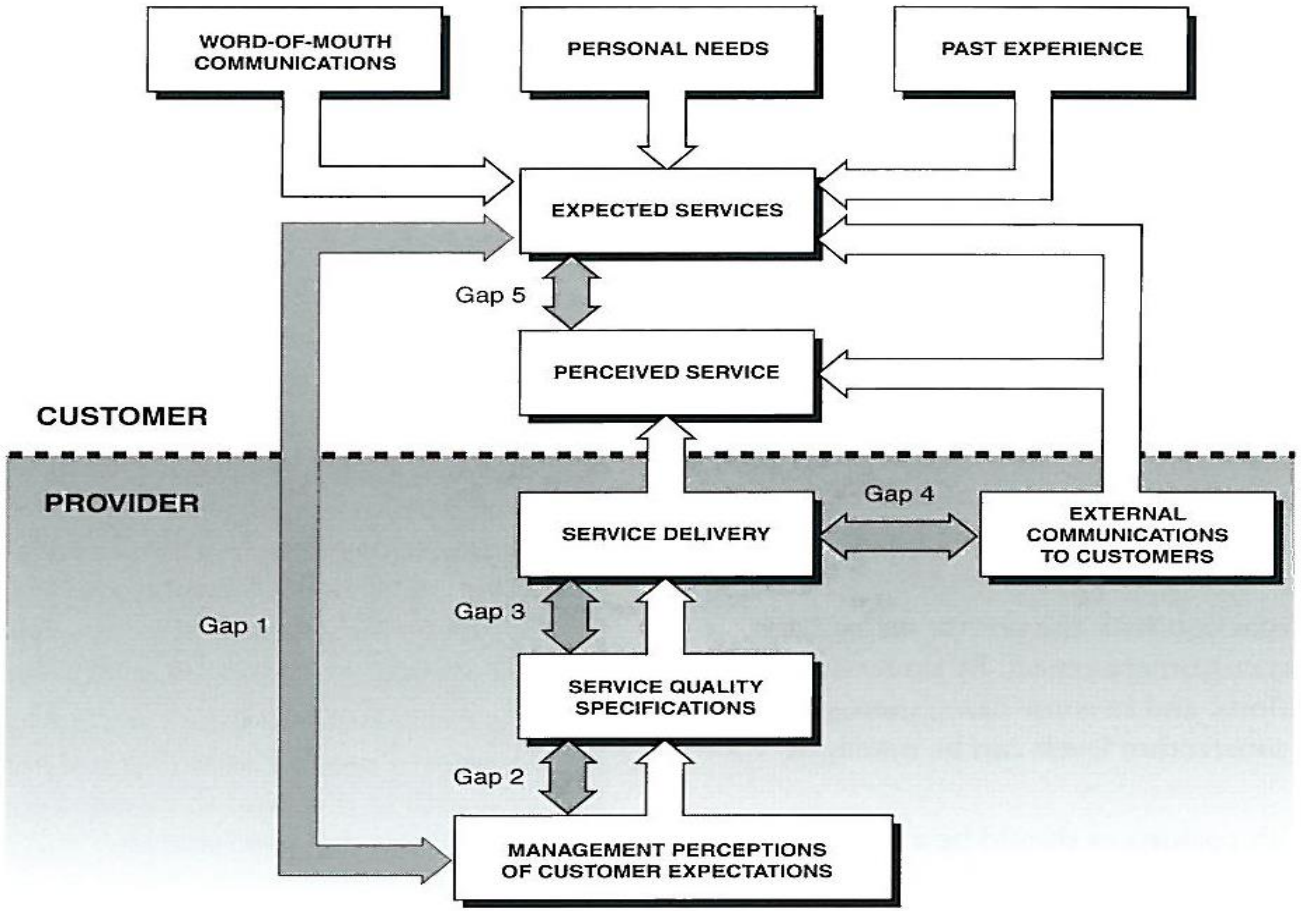


Figure 3.1.9: Service Gap Model

NZTA 2016

Our priorities over the next three years

1. Make it easy for customers to do business with us.
2. Predictable journeys for urban customers.
3. Integrate road and rail to improve freight network productivity.
4. Safer speeds that are right for the road.
5. Driving value through smart road maintenance.
6. Make urban cycling a safer and more attractive transport choice.

NZTA 2006

NZ TRANSPORT AGENCY
WAKA KOTAHI

The 2006 User Satisfaction Survey identified corners as a source of motorist dissatisfaction.

Open road corners are also responsible for 15% of Injury crashes.

CORNERS

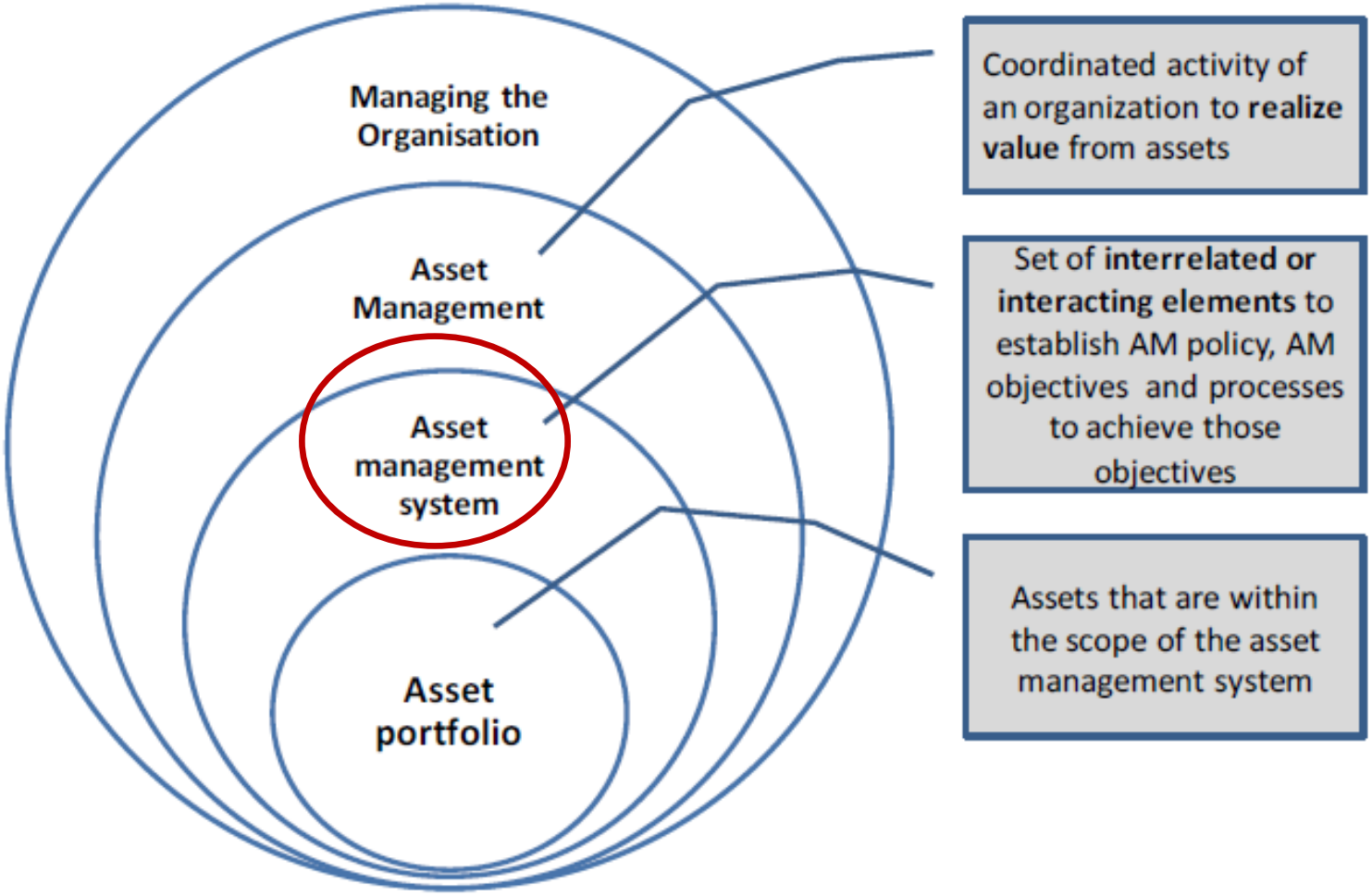
Lesson: Sometimes your customers do know what's wrong with your product. It pays to listen to them.

mainroads WESTERN AUSTRALIA

MRWA Mission 2015

To provide world class outcomes for the customer through a safe, reliable and sustainable road-based transport system

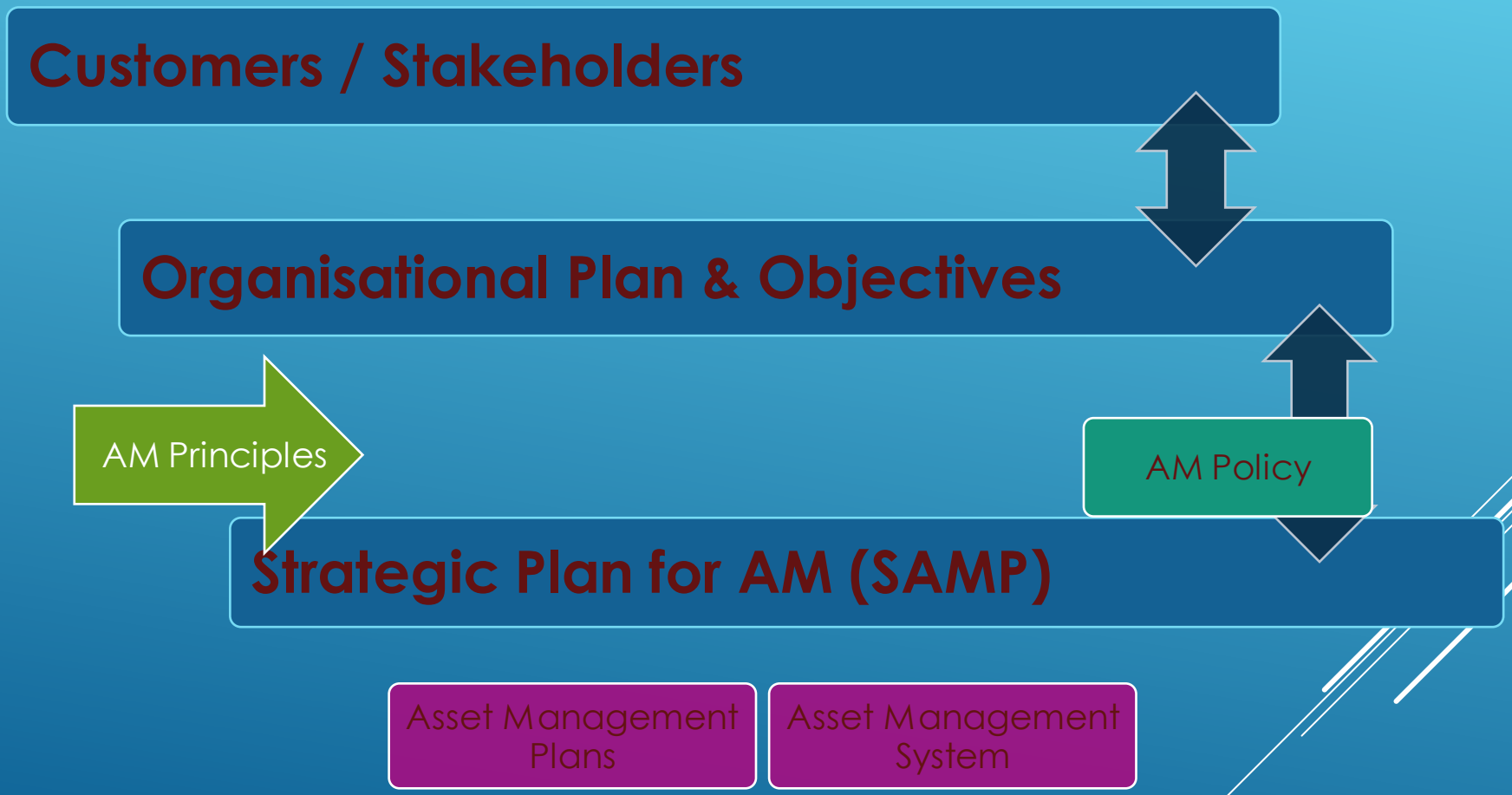
ISO 55000 Asset Management Standard



ASSET MGMT SYSTEMS

- Asset management policy
- Asset management objectives
- Strategic asset management plan (SAMP)
- Asset management plans

ASSET MGMT SYSTEMS



ASSET MANAGEMENT SOFTWARE

- NZ
  - RAMM Software Ltd
  - Good data base and tools (geospacial asset detail, maintenance detail (patching, potholes, reseal, rehab, etc)
  - Integrates with dTIMMs prediction modelling
  - Not soooo user friendly (but changing)

- WA
  - Local Gov – ROMAN II Software (RAMM + a few improvements) (LGs)
  - Main Roads WA – own system (ITIS) being developed
    - At this stage not as powerful as RAMM but good vision for it.

MAINTENANCE SCOPE OF WORK

- All asset replacement (OPEX)
  - Corridor management
    - Asset management
    - Stakeholder engagement
    - Statutory control
  - Preventative Maintenance
    - Resurfacing
  - Asset Renewals
    - Culvert replacement
    - Pavement rehabilitation
    - Shoulder works
    - Road marking
  - Routine Maintenance
    - Drainage
    - Slips & slumps
    - Potholes
    - Edge breaks
    - Etc
  - Traffic management for the above

NZ & OZ quite similar

MRWA Wheatbelt 2015

Data Analysis /

- Historical works achievement, cost and performance
- Crash data
- Traffic data
- Condition data
- Inventory data
- Customer feedback

Develop draft / perpetual Forward Works Program from unconstrained condition modelling

Filters

Levels Of Service (LOS)

- LOS Gap analysis
- Road standards
- RMIP's

Known Works

- Regional Link Plans & Strategies
- RAPID Infrastructure investment needs
- Bridge Program

Capital Works

- NSIP
- RRE
- Blackspot
- RRoRC
- Nation Building
- Safer Roads

Integration of maintenance and bridge capital works and improvement

"POLITICAL" PROJECTS – projects with other urgent priority

Draft Annual Works Program – unconstrained

Field verification: reseals, pavement repairs, shoulders, vegetation, etc.

Confirmed treatments for Annual Works Program

Treatment prioritisation according to budget constraints

"Final" Annual Works Program

Approval

Development of Project Charter

Project Delivery

Develop business case for additional funding

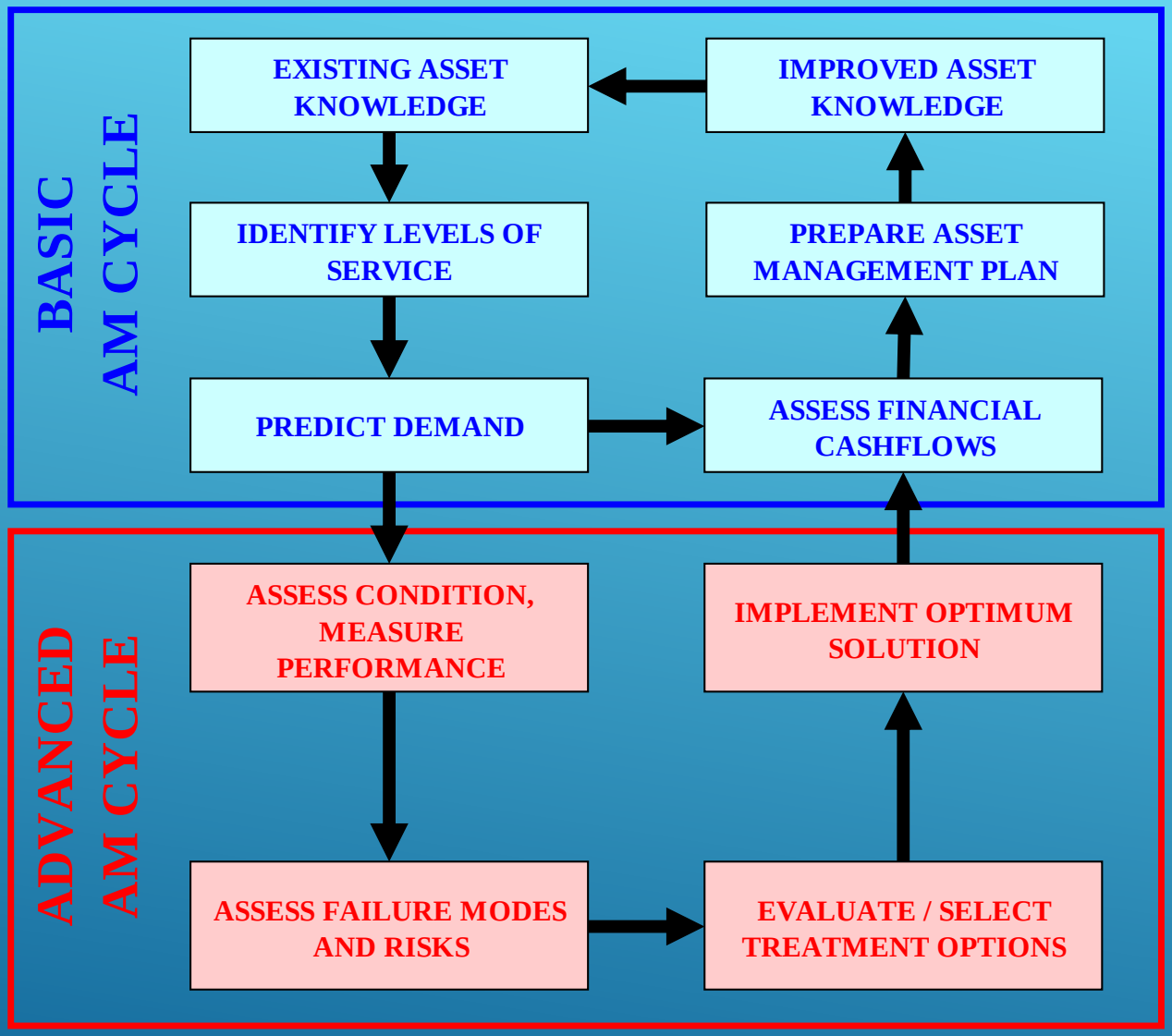
Input into Confirmed works program

Yes

Approved

No

DEFERRED MAINTENANCE REPORT
- Known locations
- Work types
- Costs



Fulton Hogan

Outcomes:

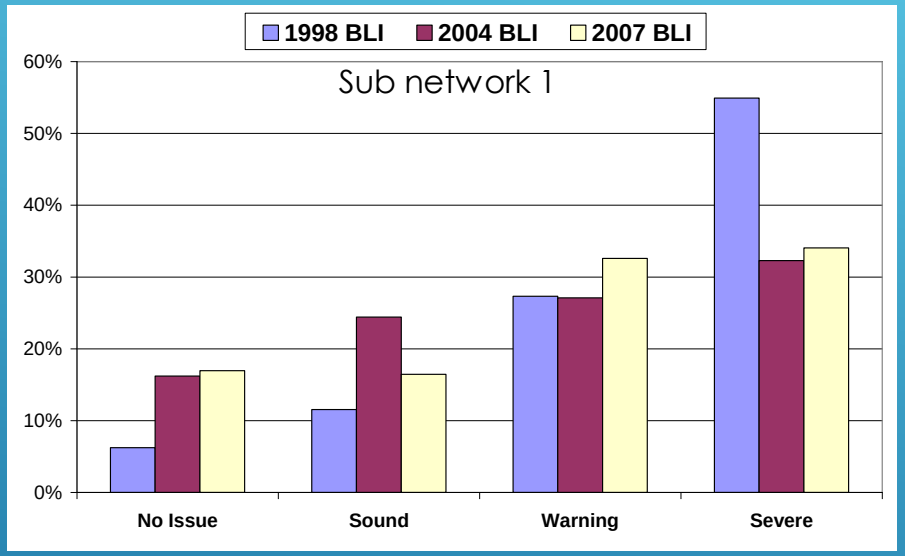
- Multi yr Forward works program
  - Treatment selection
- Multi yr Budget
- Asset Management Planning

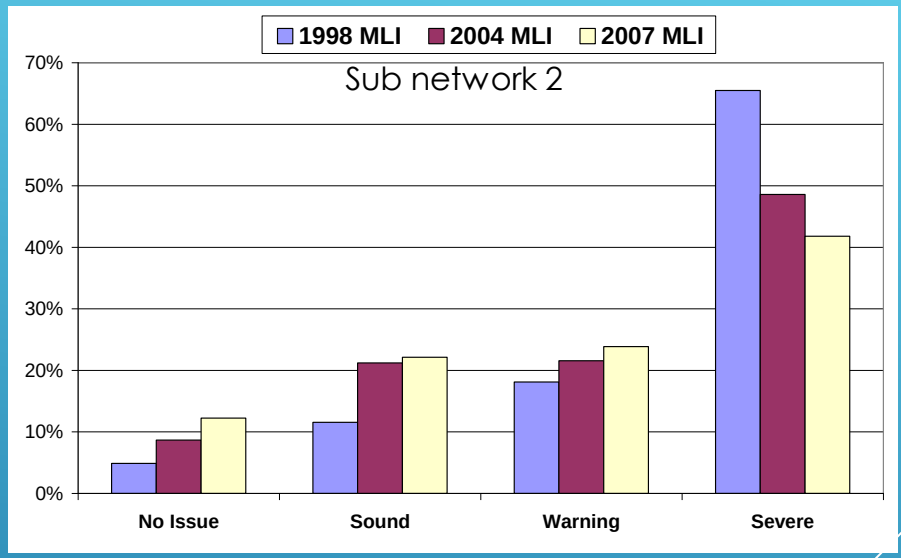
PSMC tender 2009

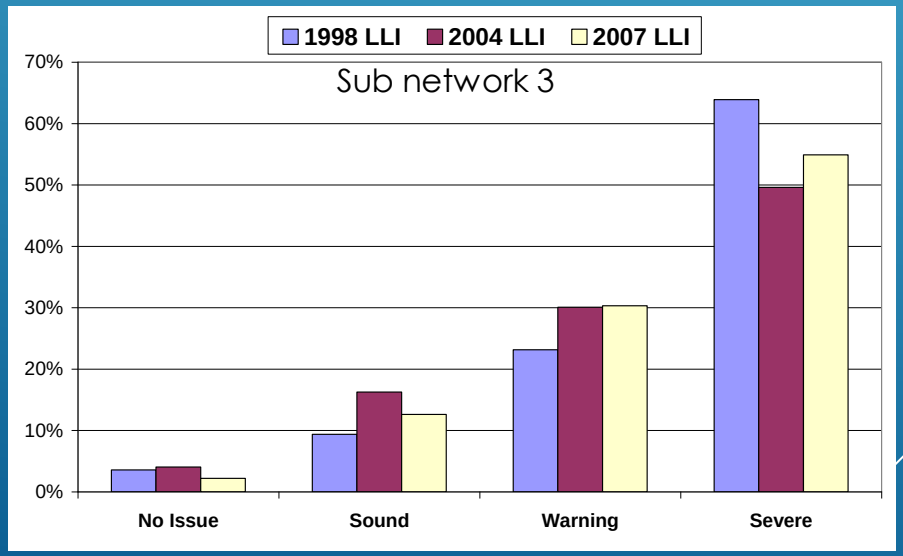
ASSET MANAGEMENT CYCLES

DEFLECTION BOWL DISTRIBUTIONS

(Pavement Stiffness)

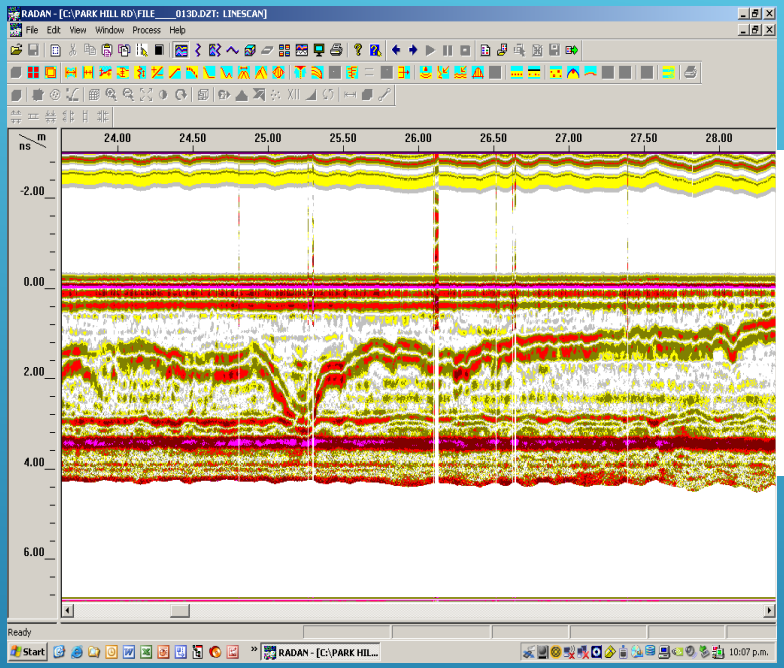


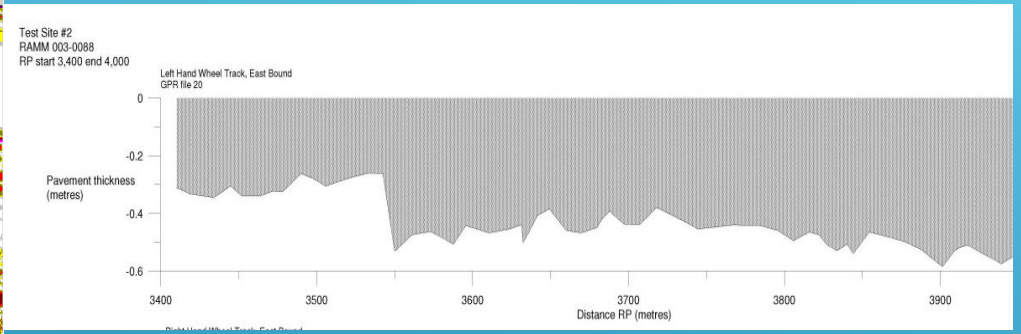




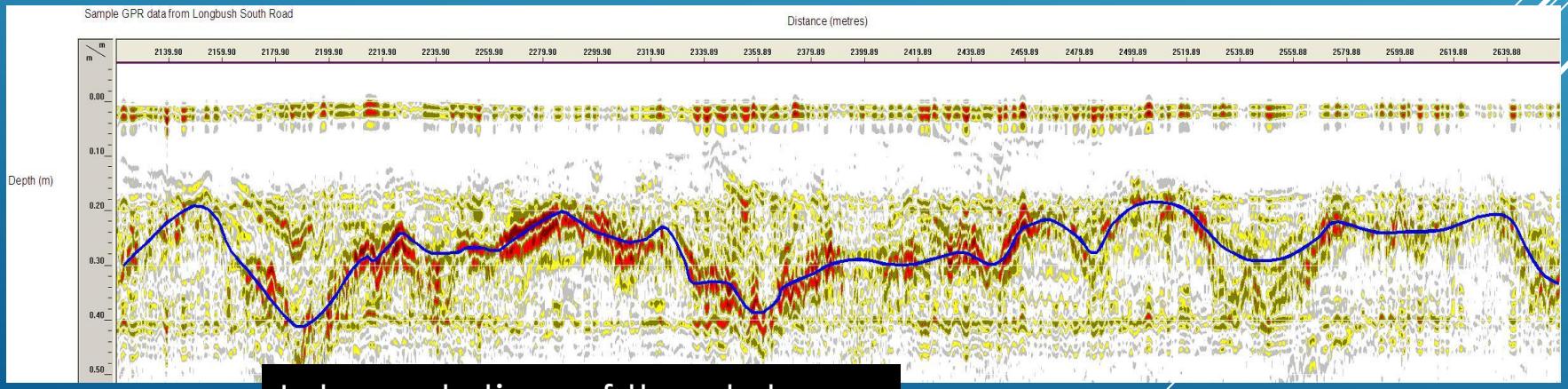
Analysis distributions to determine patterns & understand networks

PROJECT LEVEL HIGH SPEED SITE INVESTIGATION – GPR





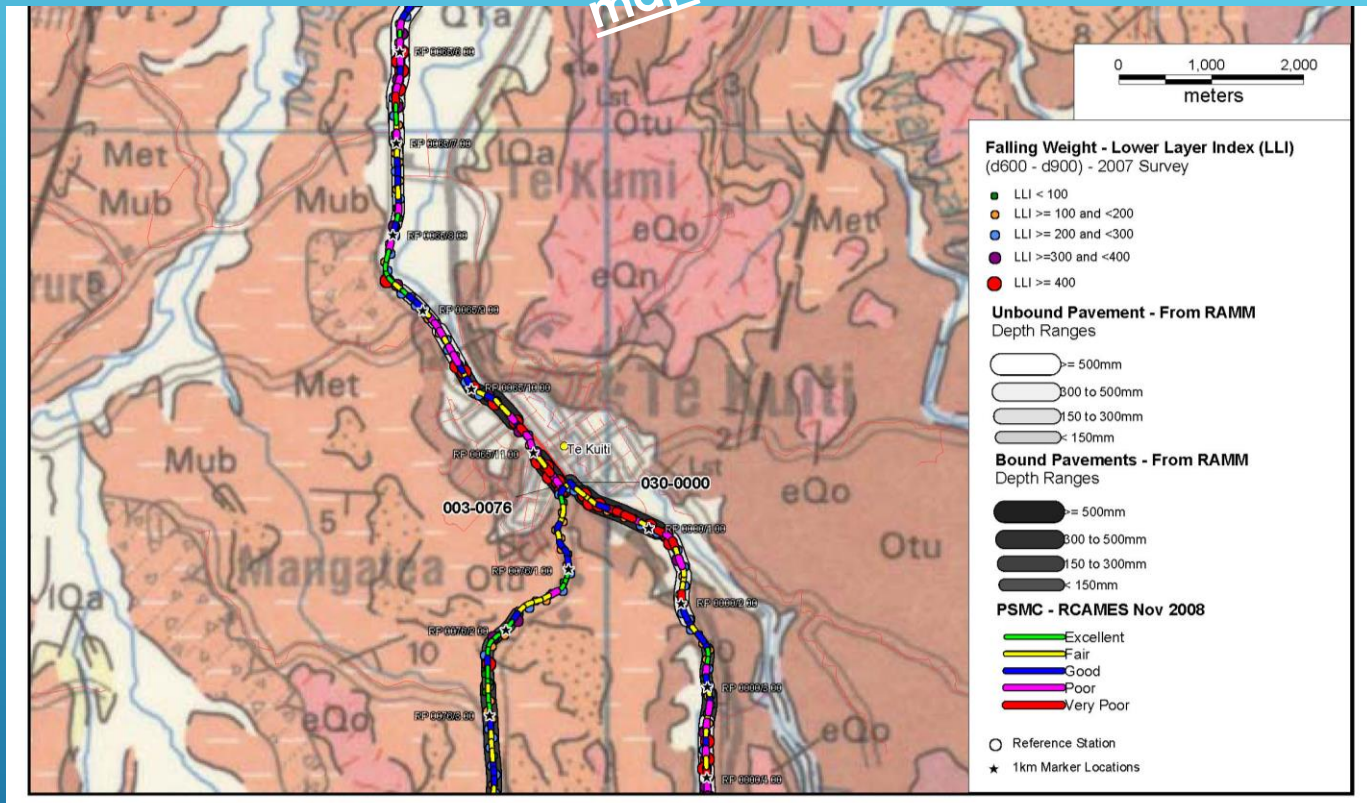
Reported Data

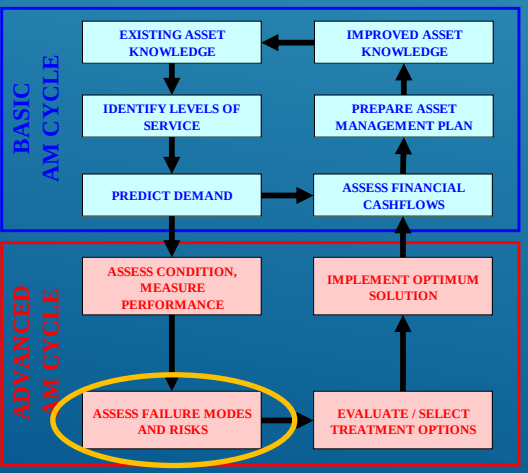


Interpretation of the data

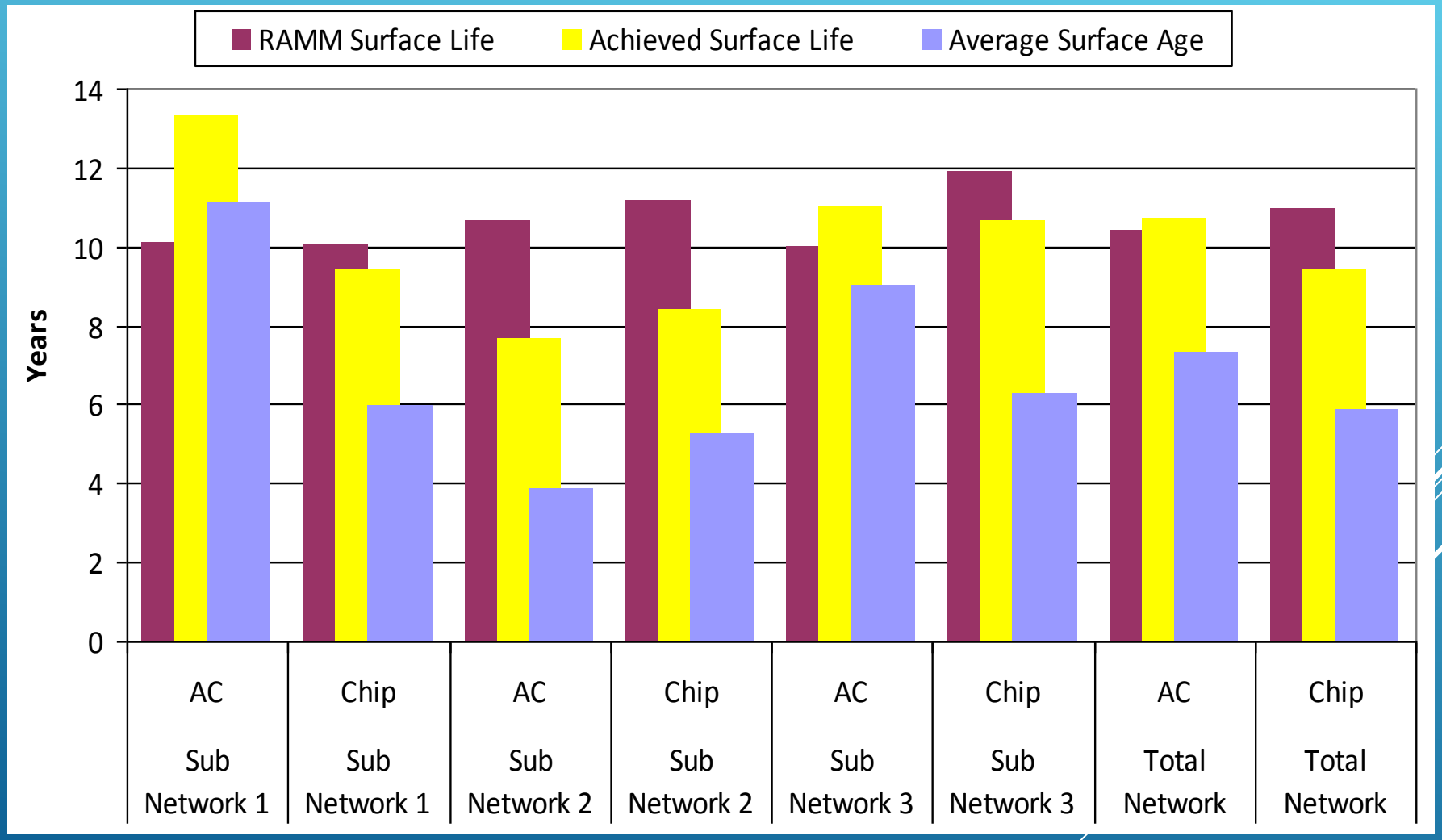
GEOLOGY

Overlay BLI, MLI & LLI with Visual details over geological map

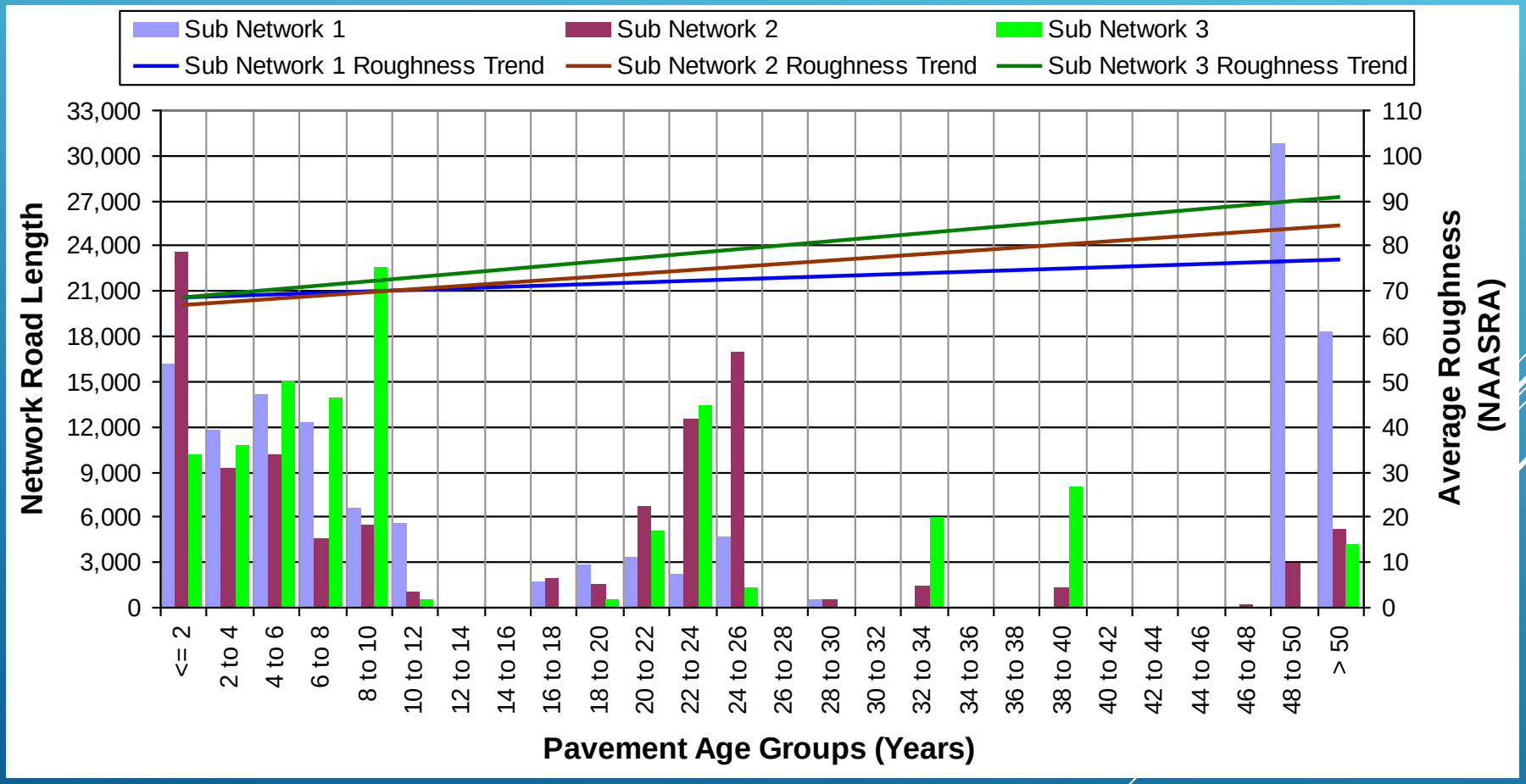




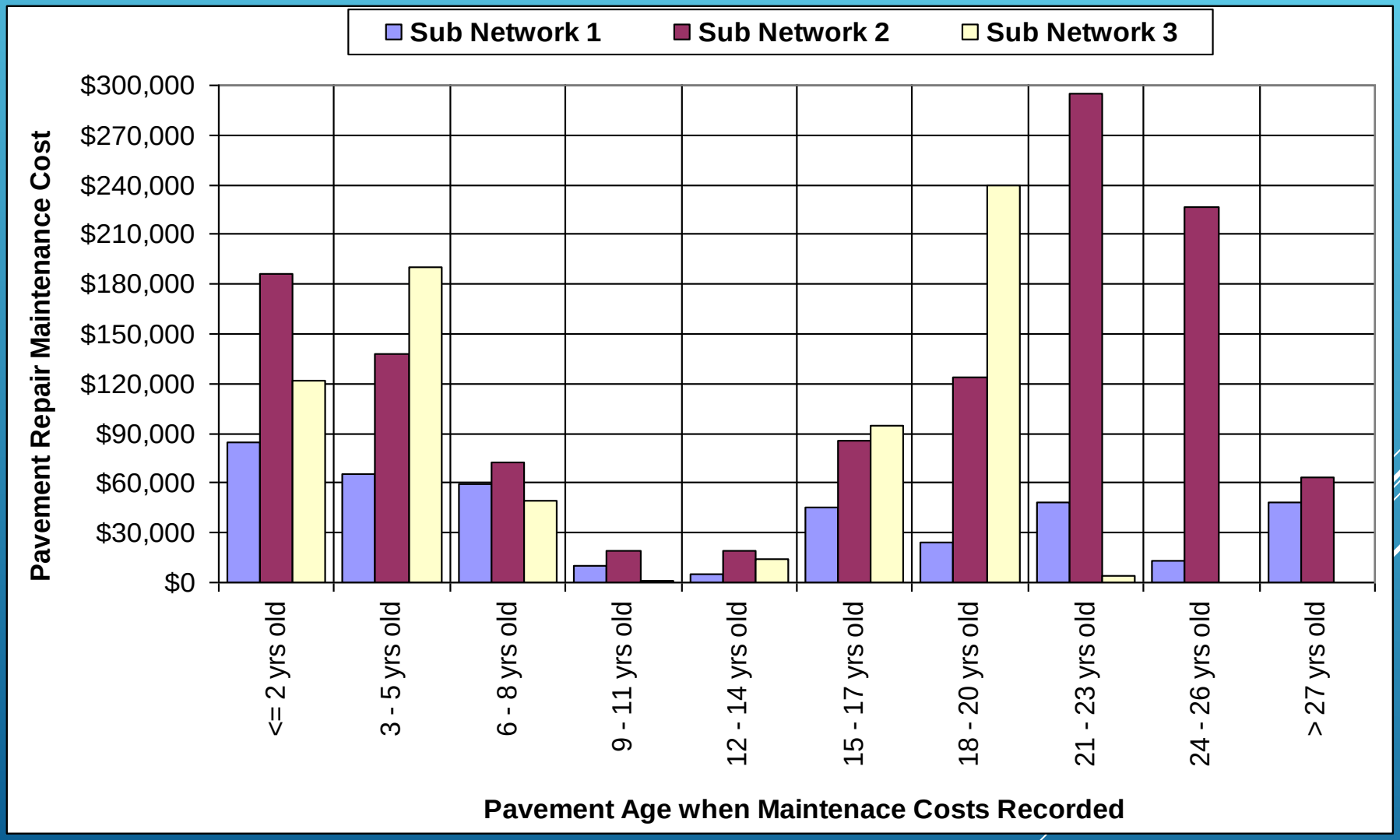
CURRENT SURFACE LIFE



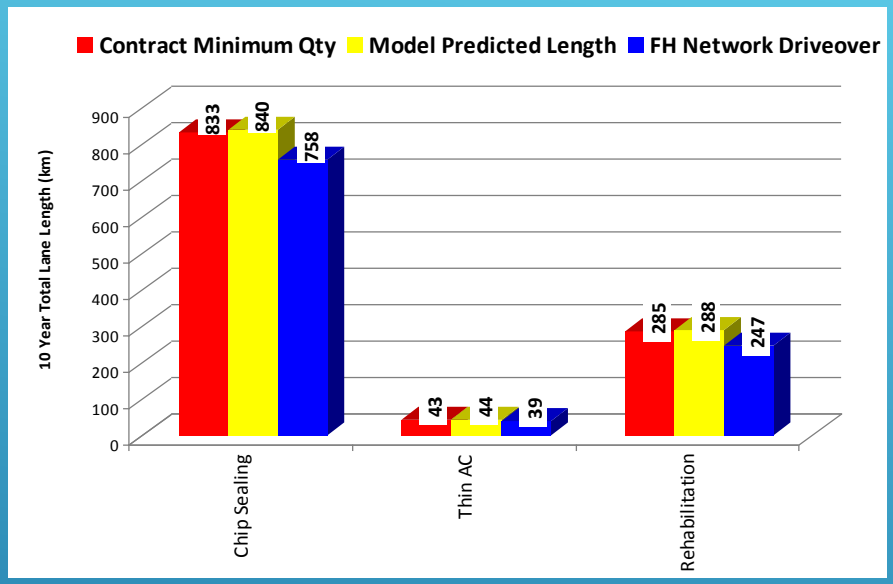
CURRENT NETWORK CONDITION

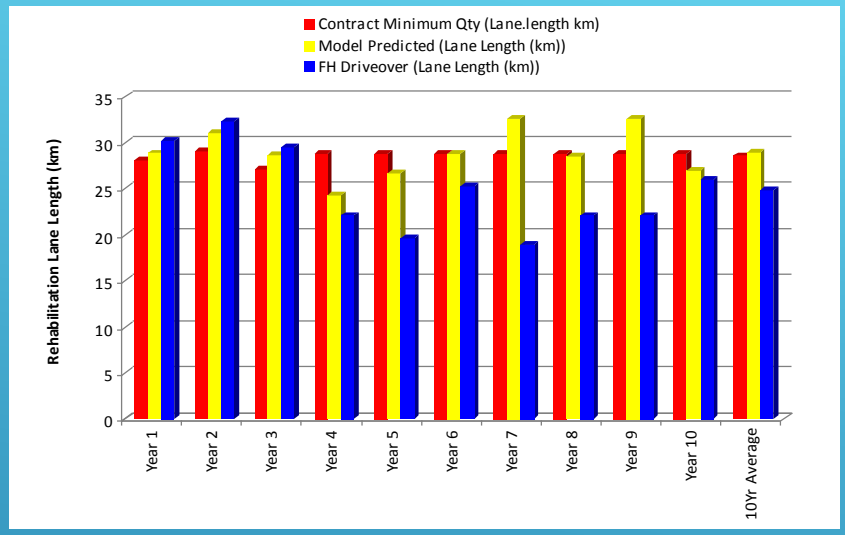


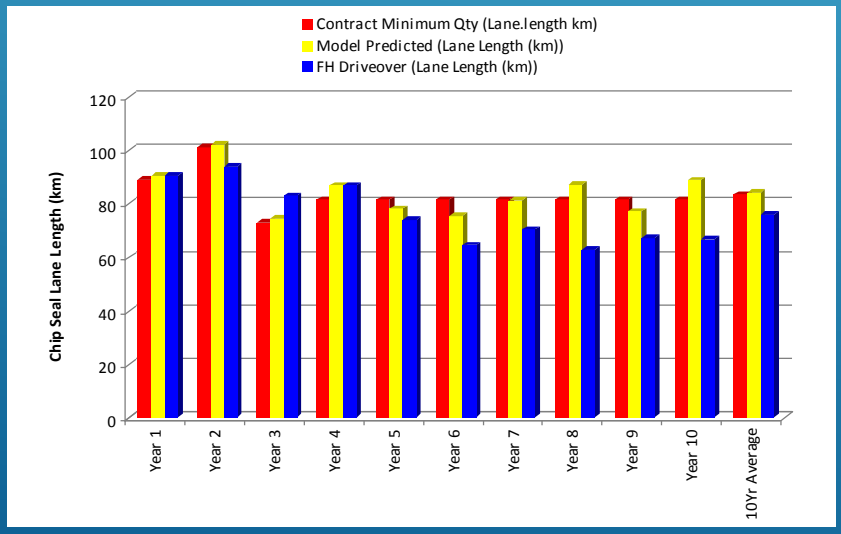
PREMATURE PAVEMENT FAILURES

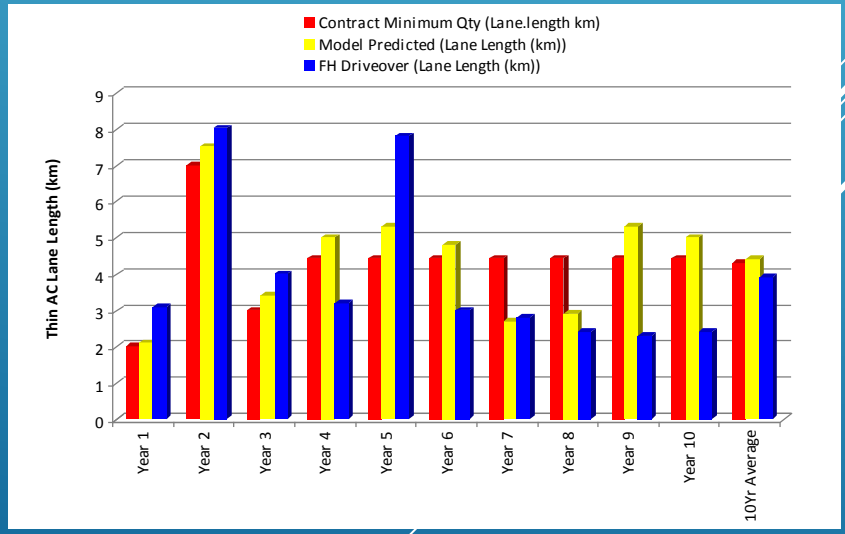


DTIMMS MODEL PREDICTIONS







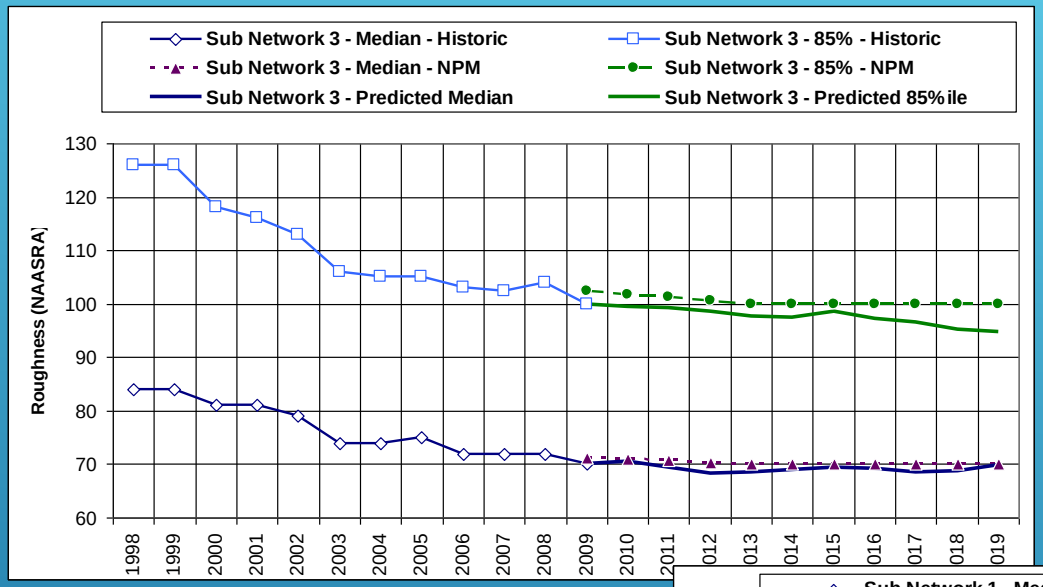


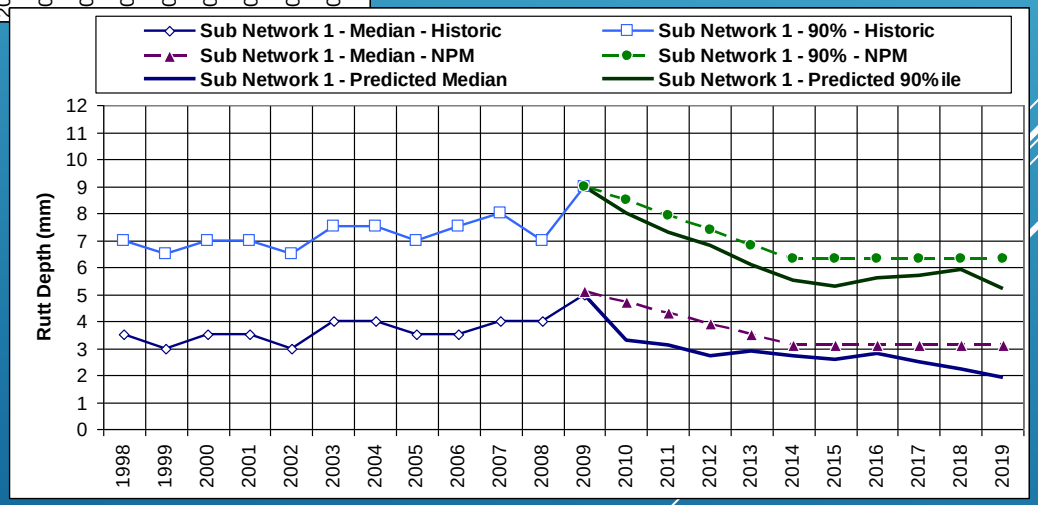
FIELD DRIVE-OVER NOTES & VERIFICATION

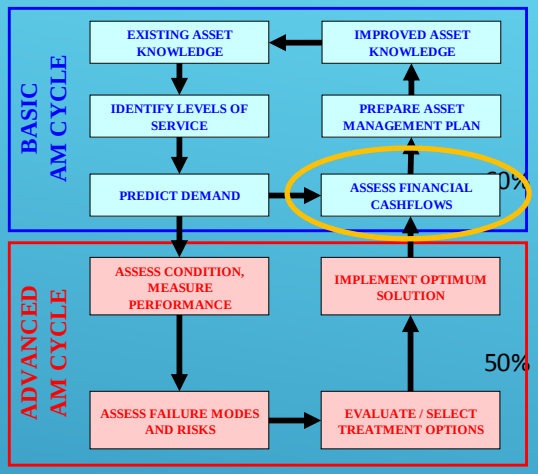
- Analysis each uniform section using Excell spreadsheet to determine draft FWP
- Carry out visual to confirm draft FWP

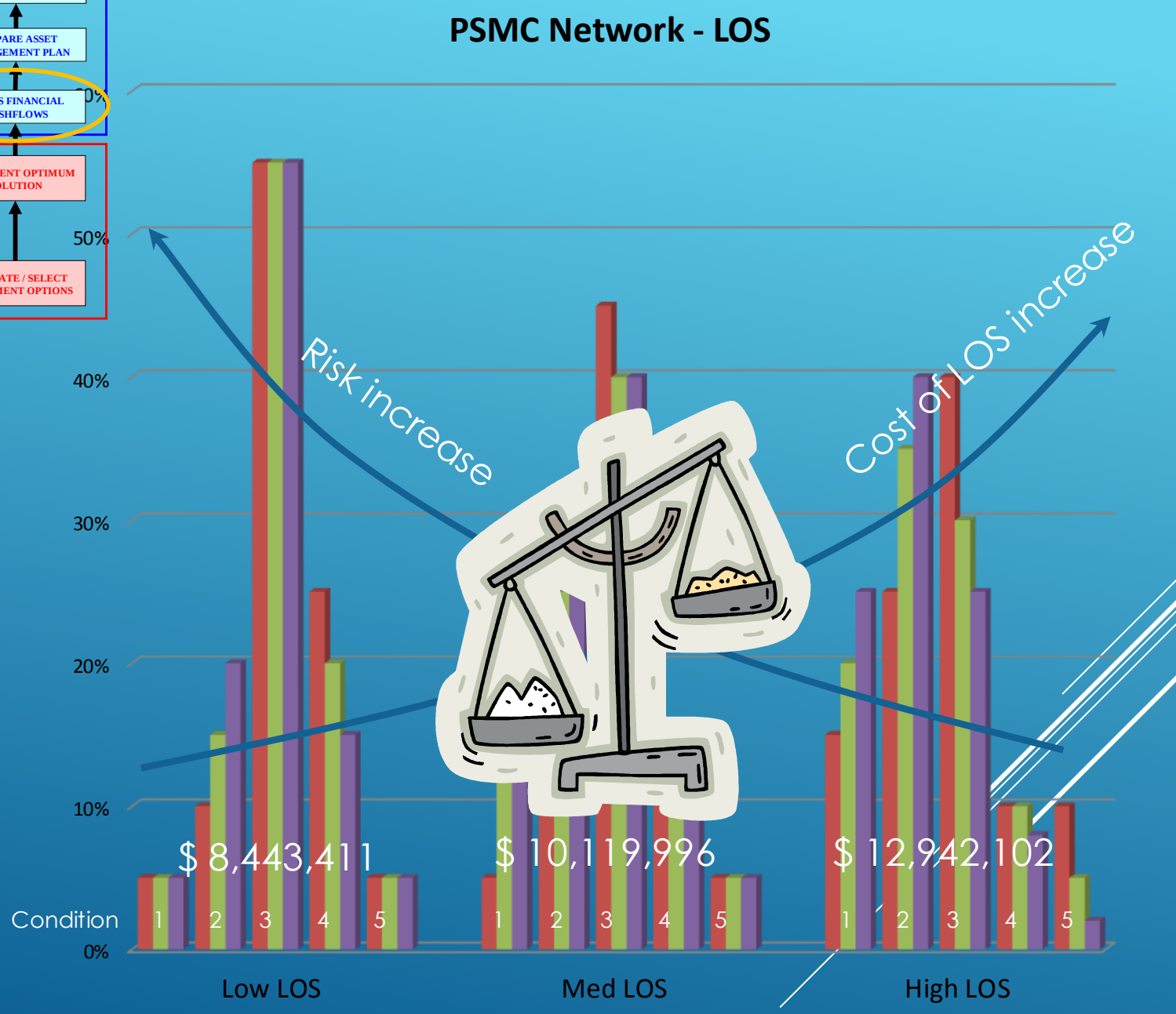
RAMM Name	Start	End	Pavement Age	Pavement Depth	Additive Quantity (%)	FWD Peak Deflection (mm)	Base Layer Index	Middle Layer Index	Lower Layer Index	Subgrade Response	Geology Type
003-0076	6700	6800	23	200	0	0.78	285	232	82	8	Q1a
003-0076	6800	6900	23	200	0	0.40	163	107	58	261	Q1a
003-0076	6900	7000	23	200	0	0.65	217	162	63	-13	Q1a
003-0076	7000	7100	23	230	0	0.41	139	74	47	-18	Met
003-0076	7100	7200	7	300	0	0.87	271	244	135	23	Met
003-0076	7200	7300	7	300	0	0.56	277	117	46	10	Met
003-0076	7300	7400	7	300	0	0.53	208	158	77	182	Met
003-0076	7400	7500	1	424	0	0.77	419	216	35	55	Met
003-0076	7500	7600	1	480	5	0.94	367	256	89	7	Met
003-0076	7600	7700	1	334	5	0.28	119	38	35	-18	Met
003-0076	7700	7800	11	280	5	0.55	106	154	59	18	Met
003-0076	7800	7900	11	280	3	0.62	205	151	61	-6	Met

DTIMMS MODEL PREDICTIONS






BASIC AM CYCLE
EXISTING ASSET KNOWLEDGE
IMPROVED ASSET KNOWLEDGE
IDENTIFY LEVELS OF SERVICE
PREPARE ASSET MANAGEMENT PLAN
PREDICT DEMAND
ASSESS FINANCIAL CASHFLOWS
ADVANCED AM CYCLE
ASSESS CONDITION, MEASURE PERFORMANCE
IMPLEMENT OPTIMUM SOLUTION
ASSESS FAILURE MODES AND RISKS
EVALUATE / SELECT TREATMENT OPTIONS


PSMC Network - LOS
60%
50%
40%
30%
20%
10%
0%
Risk increase
Cost of LOS increase
$ 8,443,411
$ 10,119,996
$ 12,942,102
Condition
1
2
3
4
5
Low LOS
Med LOS
High LOS

MAINTENANCE CONTRACT TYPES

NEW ZEALAND

CONTRACT TYPES - NZ

- **SOMAC or 'traditional' maintenance contracts**
  - Both LG and NZTA contracts
  - Generally 3yrs plus 1 + 1 contracts
  - Measure and value SOQ contract
  - Consultant road superintendent carries out asset management and issues works orders.
  - Few OPM, KPM or NPM
  - Consultant does quality checks
  - Master / slave relationship

  - **RISK BALANCE: NZTA high / Contractor low**
  - **Budget NZ$ 3-5 M p.a**

CONTRACT TYPES - NZ

- **Hybrid Contracts**
  - Generally only NZTA
  - Generally 3-5 years +1+1
  - Consultant and Contractor colaboratively carry out asset management and determine FWP
  - Measure and value SOQ contract with performance items
  - OPM, KPM or NPM to measure performance
  - Contractor does quality checks
  - Beginnings of relationship contracting

  - **RISK BALANCE: NZTA med/ Contractor med**
  - **Budget NZ$ 5-10 M p.a**

CONTRACT TYPES - NZ

- **Performance Specification Maintenance Contracts**
  - Only NZTA (although could be in conjunction with LG)
  - Generally 10 years (5yr for bridges)
  - Contractor led asset management and FWP
  - OPM, KPM or NPM to measure performance
  - Monthly LS performance items & underpinned quantities of work
  - Contractor responsible for all ie basically road authority
  - **RISK BALANCE: NZTA low/ Contractor high**
  - **Budget NZ$ 10-12 M p.a**

Expects contractor to do ideal for network ie look long term for work types.

CONTRACT TYPES - NZ

- **Alliance Contracts**
  - Generally 10 years
  - NZTA, Consultant and Contractor carry out asset management and determine FWP together, dependant on strengths
  - OPM, KPM or NPM to measure performance
  - Resources determined as required by FWP
  - Contractor does quality checks
  - **RISK BALANCE: NZTA med/ Contractor low**
  - **Budget NZ$ 10-12 M p.a**

CONTRACT TYPES - NZ

- **Network Outcome Contracts**
  - New form of contract - 2015 onwards
  - Focus on the customer journey and optimising asset investment rather than network asset
  - Generally 7 years +1 +1
  - NZTA & Primary supplier carry out asset management and determine FWP together, dependant on strengths
  - A mix of lump sum and measure and value scheduled items
  - Resources varies as required by FWP
  - Contractor does quality checks
  - **RISK BALANCE: NZTA med/ Contractor low**
  - **Budget NZ$ 10-15 M p.a**

Better alignment between dollars invested and customer network demand will improve overall customer experience

CONTRACT TYPES- MAIN ROADS WESTERN AUSTRALIA

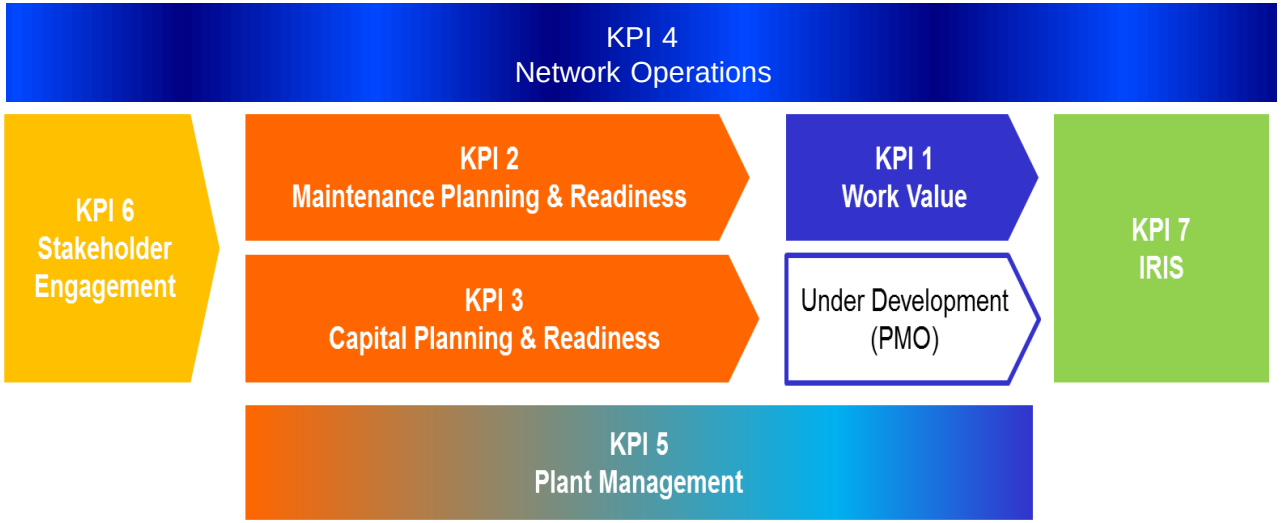
- **Integrated Services Arrangement model**

  Primary aim of contract form is to insource with the aim of skills transfer into MWRA

  - Asset management by MRWA
  - Direct management by MRWA
  - Essentially cost plus on labour, plant & materials
  - Budget AU$ 70-100 M p.a
  - Less emphasis on productivity and value for money in early years.
  - KPIs introduced 2014 to ensure MRWA getting value for money.

  - **RISK BALANCE – MRWA HIGH/ CONTRACTOR LOW**
  - **Basically a large scale day works contract with KPIs.**

MAIN ROADS KPI'S 2014/15



KPI 1 Work Value

Budget vs actual maintenance costs and quantities delivered

Analyses the variation between the baseline costs and quantities

Uses Earned Value Analysis

KPI 2 Maintenance Planning & Readiness

Robust planning in the development of the 10 year Network Plan

Readiness for key programmed maintenance activities

KPI 3 Capital Planning & Readiness

Robust planning in the development of the delivery program

Readiness for the capital investment

Aligned with the Corporate Readiness KPI

KPI 4 Network Operations

- *Incident planning and response*
- *Traffic Management planning and delivery*

KPI 5 Plant Management

- Implementation of IPWEA best practice plant and fleet management

KPI 6 Stakeholder Engagement

- Proactive and planned approach to the engagement of key stakeholders
- Focus on ISP supply chain

KPI 7 IRIS

- Supporting the Asset & Network Information Branch IRIS implementation project

Ask me what is the greatest thing in the world?

“He tangata, he tangata, he tangata!”

Translation: "It is people, it is people, it is people!

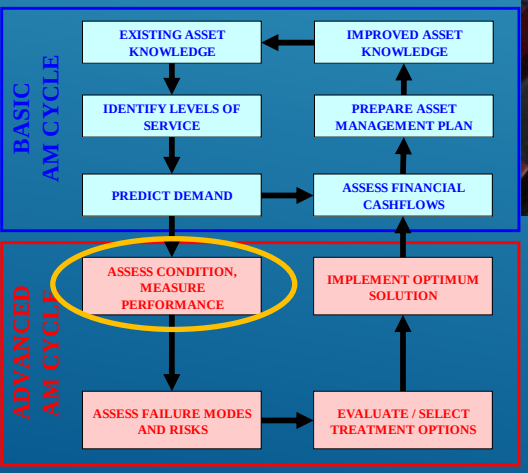
Maori proverb

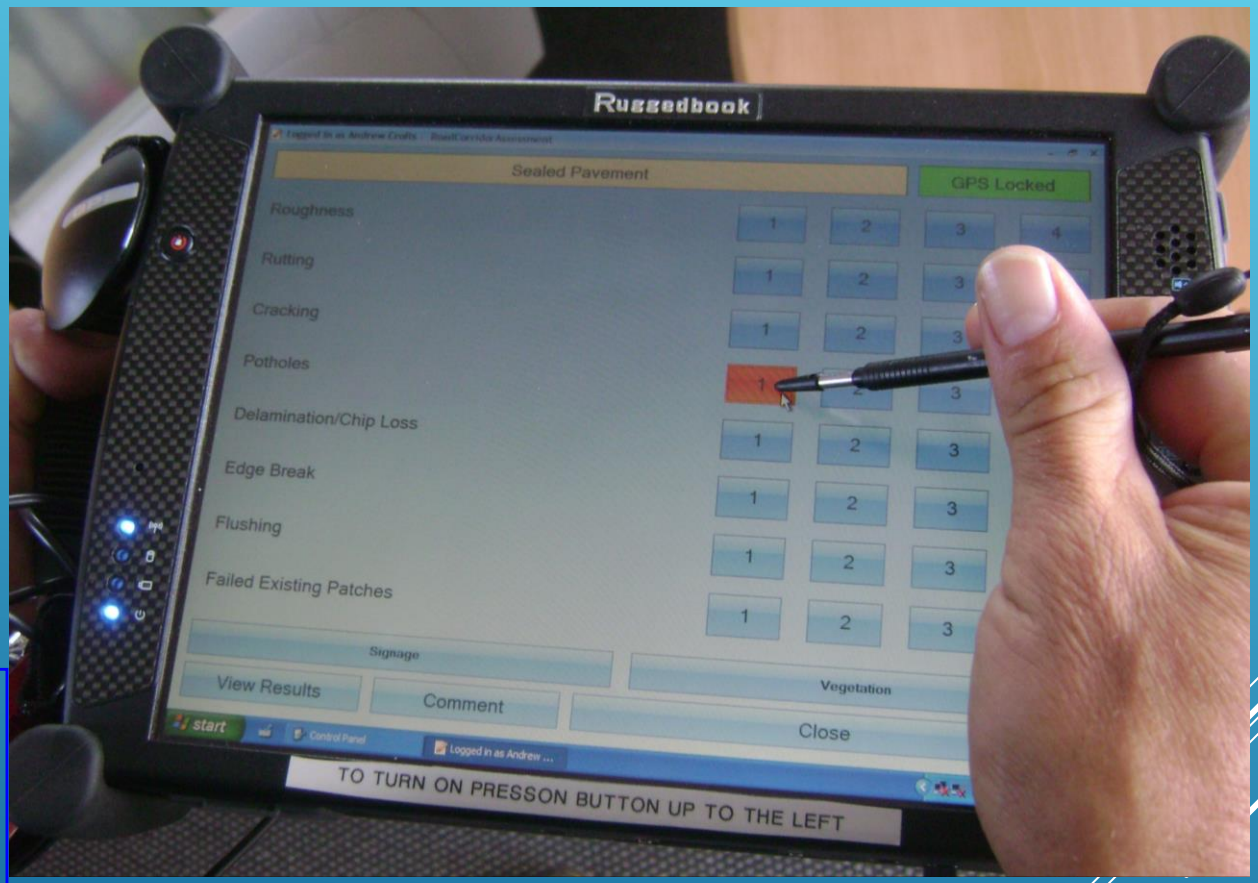
Thank you!

Questions

ASSET MANAGEMENT IN PRACTICE…

VISUAL ASSESSMENT WITH GPS





PAVEMENT PERFORMANCE MODEL DEVELOPMENT

FWDs provided by NZTA

- Subgrade and Pavement Strength determined from Falling Weight Deflectometer curvatures
- Based on 3 "Zones" of bowl, Base course, Sub-base and Subgrade
- Analysis using RSA technology (Horak & Emery) and pavement design methodology

Figure 1 *Curvature zones of a deflection bowl*

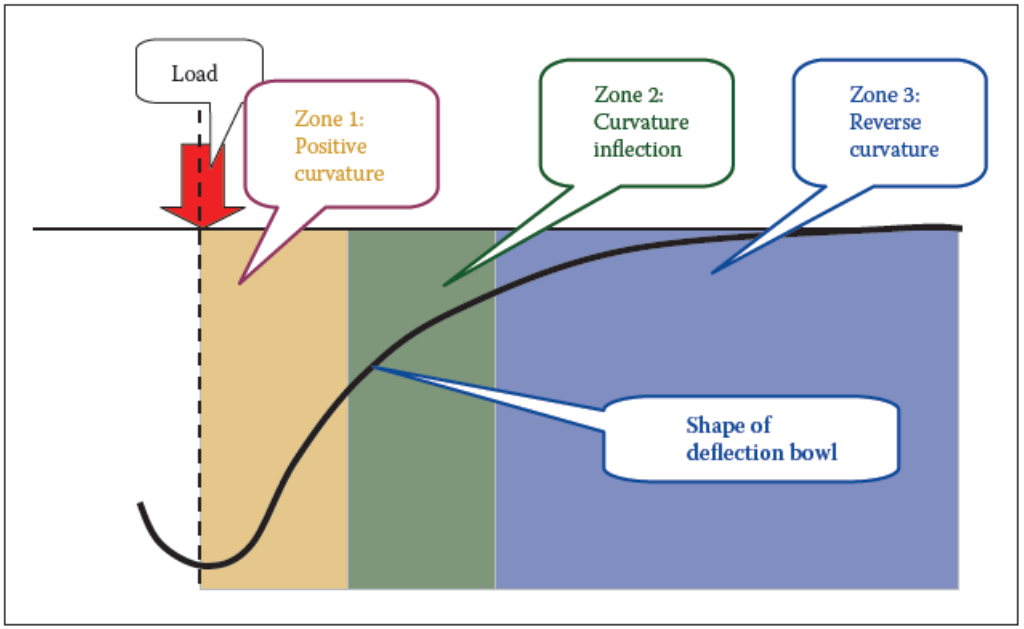


Figure 3 *Typical surface moduli plots for pavement structures (Ullidtz 1987)*