

Introduction and Development of Performance-Based Road Maintenance on
Serbian National Road Network

Project: 12SER01/11/251

**Introduction and Development of Performance-Based Road
Maintenance on Serbian National Road Network**

**Contractor Information Meeting
2nd February 2017**

Session 2: PBMC Framework

Structure for Presentations

This session:

- **Options of delivery of road maintenance;**
- **The performance-based delivery model;**
- **Responsibilities and changes in role;**
- **Performance-based Services;**
- **Performance monitoring framework;**
- **Outline of the project area.**

Road Maintenance

Objectives:

- ▶ Deliver road maintenance policy:
 - Keep roads **Open** and **Safe** for road users;
 - Provide an adequate **Level of Service** depending on economic and social importance;
 - **Protect** and **Preserve** investments in infrastructure;
 - Deal with **Incidents** and **Emergencies**;
 - Respect **Legal obligations**.

Delivery models:

- ▶ No 'standard' model for maintenance contracting (the adopted model often reflects national economic and political imperatives);
- ▶ Has to be flexible to allow for uncertainties (workload and budget allocations);
- ▶ Needs to be long-term to ensure continuity and be economic.

Delivery Models

Delivery options:

- ▶ Direct contracting (normally to State enterprises)
 - Depends on measuring works that are **difficult to quantify**;
 - Focus on **quantities** not quality;
 - No **competition** (fixed rates);
 - No **incentive** for contractor innovation.

- ▶ Traditional competitive contracting
 - Depends on measuring works that are **difficult to quantify**;
 - Focus on **quantities** not quality;

- ▶ Performance-based contracting
 - Lump sum pricing (no measurement of difficult to measure works);
 - Focus on **quality**, not quantities (more consistent service levels);
 - More incentive for innovation (more responsibility on Contractor);
 - Better focus on maintenance policy objectives.

Delivery Models

International experience:

- Widespread use of performance indicators to assess quality of road maintenance delivery ;
- Performance standards built into contracts or agreements;
- Long term contracts with delegation of management responsibility;
- Competitive procurement.

Experience from OPBRM pilot project:

- First experience of the approach – some initial problems;
- Positive feedback on results but improvements required to Specifications;
- Winter Service (using Weather Information System) was said to result in cost savings;
- PERS decided to retain the OPBRM model (with some changes) for future contracts.

PBMC Delivery Model

Adopted structure:

- ▶ 'Hybrid' 5 year contracts for **Services** and **Works**;
- ▶ Services:
 - 100% performance-based – paid monthly on Lump Sums with 'demerit points' (payment deductions) if standards not achieved.
 - Management and Administrative responsibilities;
 - Patrolling and incident response;
 - Mostly 'non-repair' Routine Maintenance activities;
 - Winter Service (based on Road Weather Information System).
- ▶ Works:
 - Measured - paid on unit rates in BoQ;
 - Carried out on basis of Work Orders from PERS Project Manager for completion in specified time periods (Liquidated damages apply for late completion)
 - Maintenance Works (all 'repair and/or replace' activities);
 - Pavement Preservation Works (resurfacing and sealing);
 - Dayworks (for Emergencies and unforeseen activities).

PBMC Delivery model

Payment framework:

Services

Individual Lump Sums for specific activities

Paid monthly for periods when service levels are assessed (Summer/Winter)

Paid according to quality (sample inspections and deadlines)

Payment reduction applies in case of non-compliance (Demerit points)

Payment adjusted for actual km under maintenance

Works

Unit rates in contract BoQ with estimated annual quantities

Actual quantities confirmed in Work Programme and Work Orders from Project Manager

Payment for actual work carried out.

Retention and Defects Liability applies to major works (resurfacing and major repairs)

Liquidated damages apply if works not completed on time.

PBMC Responsibilities

EMPLOYER (PERS)

Contract Management
Payment
Contract variations (Change Orders)

PROJECT MANAGER (PERS Representative)

Supervision Consultant

Contract Administration
Approvals
Issue of Work Orders
Co-ordination with 3rd parties
Inspections (Service Levels)
Validate payment

CONTRACTOR

Road Manager

Performance Management
Unit

Preparation of Plans and Programmes
Execute all Services and Works
Monitor Service Levels
Reporting
Liaise with 3rd parties
Deal with incidents and emergencies

PBMC Changes in Roles

- **Move to PBMC requires changes in working relationships:**

Employer:

- ▶ Monitoring rather than instructing;
- ▶ Facilitate rather than regulate – co-operative working.

Contractor:

- ▶ More responsibility for planning and programming works (Performance Management Unit)
- ▶ New skills required to support management role;
- ▶ Not dependant on instructions from PERS for Services;
- ▶ Takes risk for estimating works that are difficult to measure (in Lump Sums).

Potential advantages

For Contractors:

- ▶ Continuity of workload over 5 year period;
- ▶ Steady income from Lump Sum payments;
- ▶ More emphasis on resurfacing (pavement preservation works);
- ▶ Greater flexibility in deciding working methods and management set-up;
- ▶ More control over planning and programming.

For PERS:

- ▶ More focus on quality aspects rather than work quantities;
- ▶ Improved operating conditions for road users;
- ▶ Improved reporting on road conditions and road inventory for network monitoring and management;
- ▶ Improved transparency and accountability.

Services:

▶ Management Services

- Organisation
- Programmes and Plans
- Inspections (Routine, Seasonal, Winter)
- Reporting (Daily Diary, Incidents, Monthly, Seasonal, Winter)
- Road Database (update road inventory data)

▶ Road Operation Services

- Cleaning roadway, vegetation control, trimming trees;
- Shoulder profiles
- Drainage cleaning (side drains, gutters, culverts), Bridge and Tunnel drainage;
- Cleaning signs and reflectors.

Services

▶ Bridge and Tunnel Operation Services

- Clearing vegetation, debris and obstructions;
- Cleaning bridge and tunnel drainage.

▶ Winter Service

- Preventive treatments (preventing ice formation and accumulation of snow)
- Combined treatments (snow and ice removal)

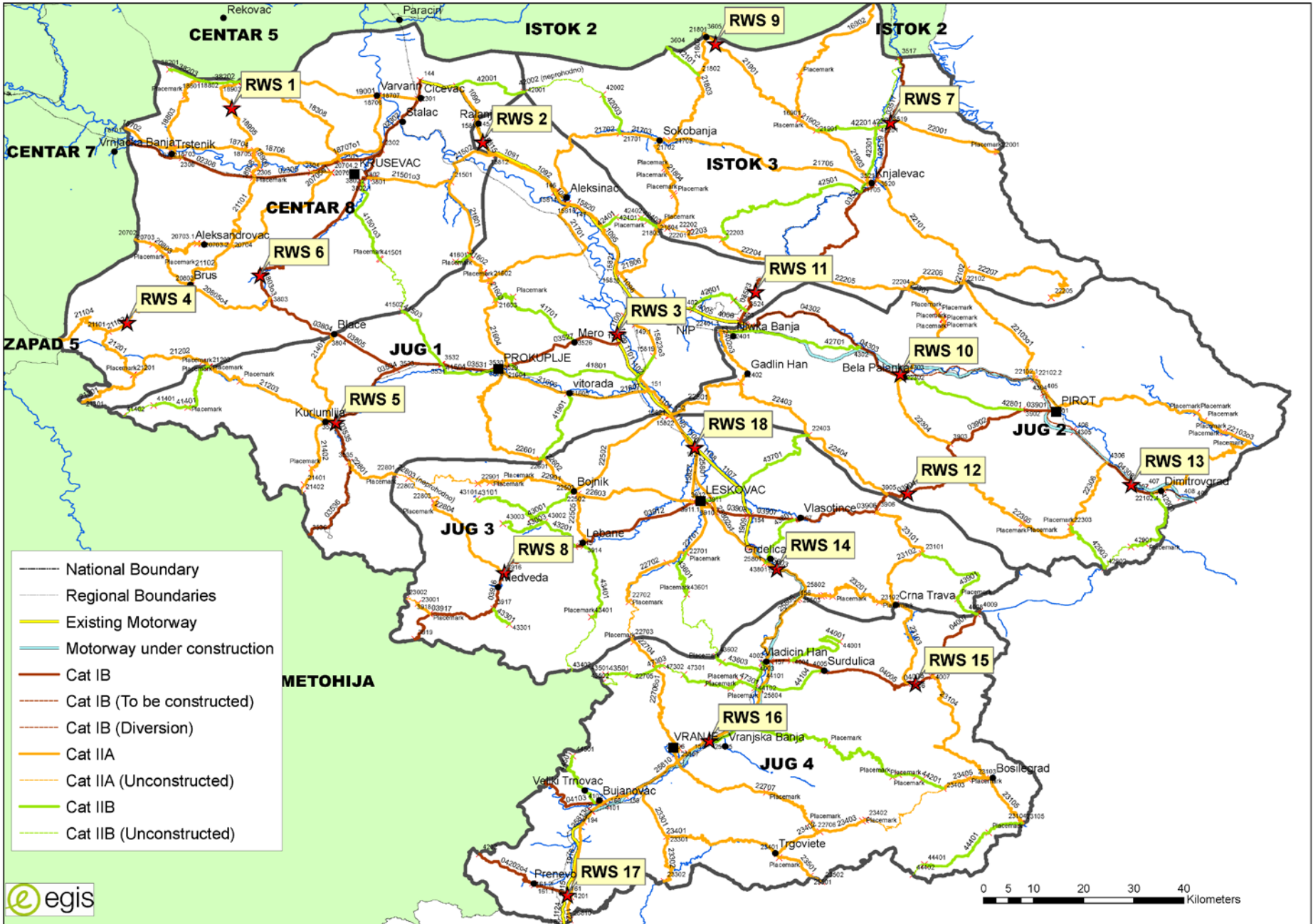
Priorities:

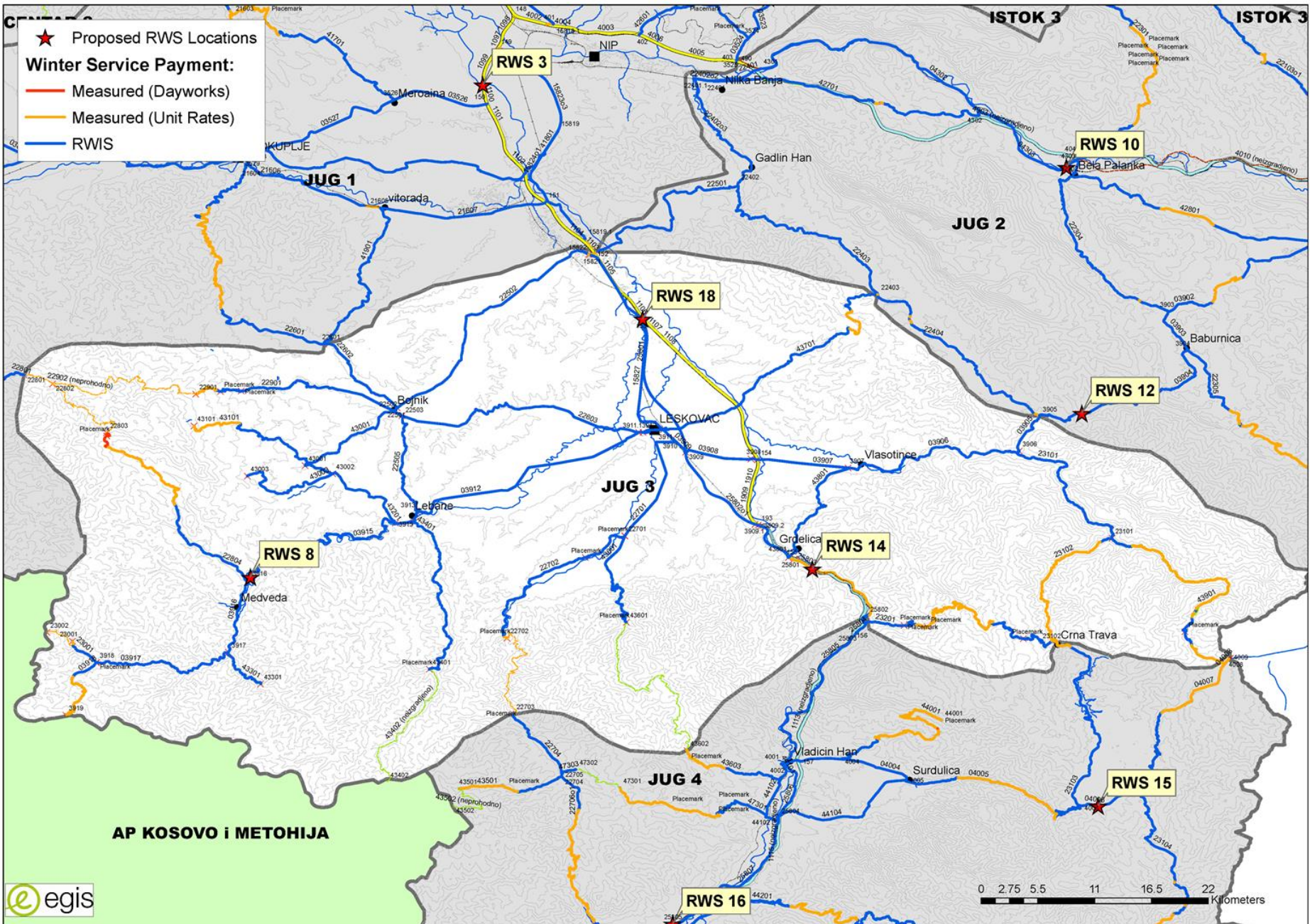
- ▶ Set through **Service Levels** under 3 Maintenance Categories (A, B and C):

Mtce Category	A	B	C
km	692.4	1031.5	1277.5

Winter Service

- ▶ PERS decided to retain a Road Weather Information System for regulating payment of Winter Service;
- ▶ 18 Weather Stations and Road Weather Information System being procured to serve project area (installation planned later in 2017):
- ▶ RWIS will be used by:
 - Contractors: for **planning** operations
 - PERS: for **payment** of 'Weather Events' as defined in Specifications
- ▶ Road networks divided into 3 categories for payment.
 - Payment according to RWIS data (the majority of roads);
 - Payment on unit rates according to actual interventions;
 - Payment on Dayworks (extreme conditions).
- ▶ Performance criteria are applied in all cases except for Extreme Weather Events.





Performance Monitoring framework

Contractor:

- ▶ **Monitors his own Performance** (Performance Management Unit);
- ▶ Submits **Monthly Statements** to Project Manager for verification.

Service Level Inspections:

- ▶ Project Manager conducts informal inspections;
- ▶ Informs Contractor of non-compliance and gives time limit for correction of defects;
- ▶ Joint Inspections carried out Monthly by Project Manager and Contractor after receipt of Contractors Monthly Statement;
- ▶ Sample km sections of network are inspected:

Season	Maintenance Category		
	Category A	Category B	Category C
Summer	5	3	2
Winter	3	2	1

- ▶ Demerit points awarded in case of non-compliance

PBMC Monitoring Framework

A.1.1 Cleanliness of the Roadway

Service Measures:		<p>Cleanliness of traffic lanes: Presence of foreign material on the road surface posing a potential hazard to road users</p> <p>Cleanliness of shoulders: Debris on shoulders</p> <p>Cleanliness of bus stops and parking areas: Debris in parking areas and bus stops</p> <p>The Item shall cover routine cleaning of the pavement from gritting sand, debris, garbage and litter, other objectionable materials, loading and transport of material out of the road reserve and disposal in approved locations.</p>							
Code	Feature/ Location	Criteria	Season	Minimum Level (All Categories)	Maximum length for repeat defects	Time for corrective action (days)			Demerit points
						Cat. A	Cat. B	Cat. C	
C.1.1.a	Traffic lanes	Silt, debris, rocks, garbage or any other hazard to traffic on the road pavement.	S	None present	500 m	1	2	2	1
C.1.1.b	Traffic lanes	Debris, rocks, garbage or any other hazard to traffic on the road pavement.	W	None present	500 m	1	2	2	1
C.1.1.c	Shoulders	Debris, rocks, garbage or any other hazard to traffic on the shoulders	S	None present	500 m	5	10	15	1
C.1.1.d	Bus stops	Debris or garbage within bus stops	S	None present	500 m	1	2	2	1
C.1.1.e	Parking areas	Debris or garbage obstructing access to parking areas	S	None present	500 m	5	10	15	1

Project Area

Project area:

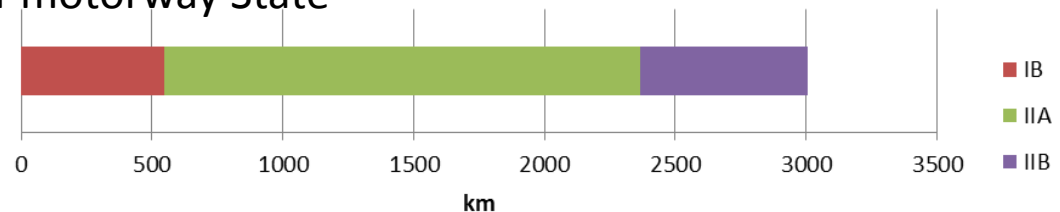
- Krusevac, Nis and Vranje

- Maintenance territories:

- ▶ South Region: S1, S2, S3, S4
- ▶ Central Region: C8
- ▶ East Region: E3

- Network:

- ▶ Categories: IB, IIA and IIB
- ▶ Total length : 3 001 km
- ▶ Approx. 21% of non-motorway State Road Network



All Maintenance Territories: Point Features

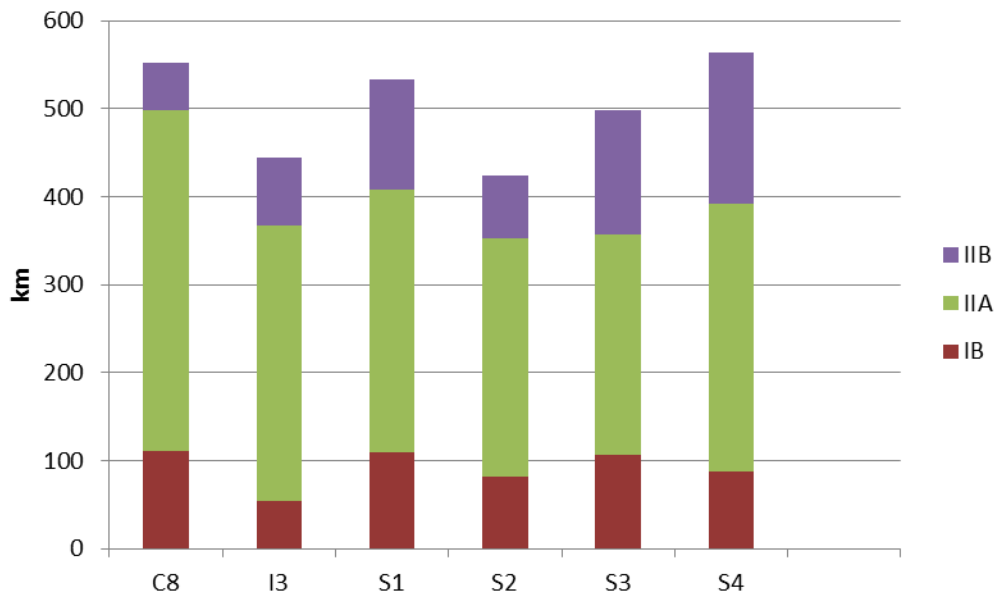
FEATURE (N°)		Maintenance Category			TOTAL	
		A	B	C		
BRIDGES	IB	132	3	0	135	
	> 20 m span	0	0	0	0	
	IIA	72	214	115	401	
	> 20 m span	0	0	0	0	
	IIB	4	5	103	112	
	> 20 m span	0	0	0	0	
	Total	208	222	218	648	
	> 20 m span	0	0	0	0	
CULVERTS	IB	1232	52	0	1284	
	IIA	556	2361	1629	4546	
	IIB	7	109	1379	1495	
	Total	1795	2522	3008	7325	
	Type:					
	Arch	201	78	134	413	
	Box	323	429	408	1160	
	Pipe	1266	1994	2462	5722	
	Total	1790	2501	3004	7295	
	Condition:					
	Good	0	369	568	621	1558
	Cleaning needed	1	1151	1593	1934	4678
	Blocked	2	240	308	398	946
Damaged	3	30	32	51	113	
Total	1790	2501	3004	7295		
SIGNS	IB	3927	223	0	4150	
	IIA	1032	4867	1797	7696	
	IIB	44	157	1503	1704	
	Total	5003	5247	3300	13550	
INTERSECTIONS	Crossroads	113	83	69	265	
	Junction Left	345	398	383	1126	
	Junction Right	363	437	457	1257	
	Roundabout	0	5	1	0	
	Total	821	923	910	2648	
PARKING/BUS STOPS	IB	399	4	0	403	
	IIA	139	229	153	521	
	IIB	0	2	53	55	
	Total	538	235	206	979	
RAILWAY CROSSINGS	IB	3	1	0	4	
	IIA	2	7	8	17	
	IIB	2	0	8	10	
	Total	7	8	16	31	

All Maintenance Territories: Linear Features

FEATURE (Km)		Maintenance Category			TOTAL
		A	B	C	
CARRIAGEWAY	Asphalt	720.189	967.724	1204.757	2892.67
	Cobblestone	1.671	0	13.206	14.877
	Concrete	0	0	7.582	7.582
	Gravel	2.213	9.515	71.187	82.915
	Total	724.073	977.239	1296.732	2998.044
TUNNELS	IB	1.135	0	0	1.135
	IIA	0	0	0.18	0.18
	IIB	0	0	0	0
	Total	1.135	0	0.18	1.315
TERRAIN	Open	305.021	257.274	274.639	836.934
	Town/Village	255.883	409.44	363.766	1029.089
	Tree Lined	167.849	298.349	648.254	1114.452
	Total	728.753	965.063	1286.659	2980.475
DRAINAGE	Gutter	278.35	330.068	277.446	885.864
	Lined	11.428	16.273	5.509	33.21
	Unlined	386.622	562.184	656.247	1605.053
	Total	676.4	908.525	939.202	2524.127
SECURITY BARRIER	IB	209.1095	6.787	0	215.8965
	IIA	51.989	151.618	31.911	235.518
	IIB	0.629	2.05	26.429	29.108
	Total	261.7275	160.455	58.34	480.5225
RAISED SIDEWALKS	IB	162.759	6.09	0	168.849
	IIA	10.097	155.197	123.921	289.215
	IIB	3.219	2.619	43.683	49.521
	Total	176.075	163.906	167.604	507.585
RETAINING WALLS	IB	9.424	0	0	9.424
	IIA	0	0	0	0
	IIB	0	0	0	0
	Total	9.424	0	0	9.424

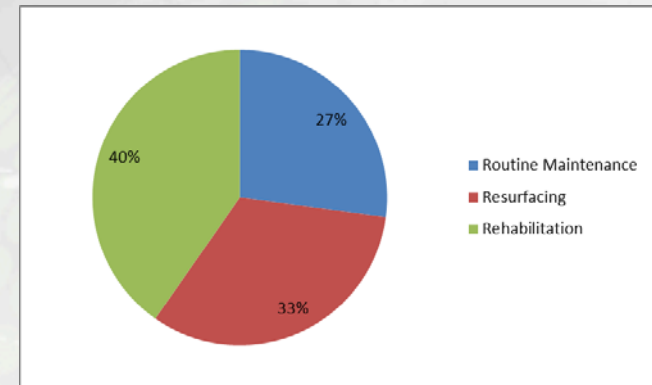
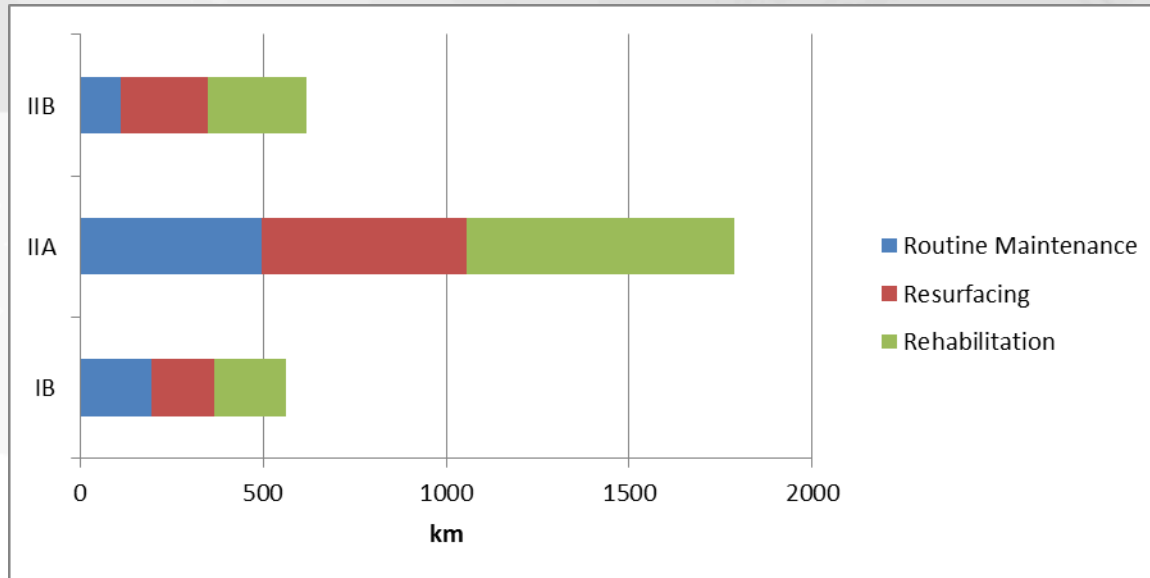
Road Network by Territory

6 LOTS – 1 per Maintenance Territory



Territory	Road km	Dual (L) km	TOTAL km
C8	546.901	4.829	551.73
I3	444.368	0.000	444.368
S1	529.658	3.034	532.692
S2	422.168	1.847	424.015
S3	496.519	2.154	498.673
S4	561.848	2.219	564.067
TOTAL	3001.462	14.083	3015.545

Overall Road Condition



Only 27% in Good condition (routine maintenance)

33% in Fair condition (needing resurfacing)

40% in Poor condition (needing rehabilitation)