



An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

ROADS Services Training Group

LOCAL AUTHORITY ROADS CONFERENCE and EXHIBITION - 2019

Lyrath Estate Hotel, Kilkenny, May 2019.

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Assessing the Condition of the Irish Regional Roads Network – 2018

**Dr. Kieran Feighan – PMS Pavement Management
Services Ltd**

John McCarthy - DTTAS

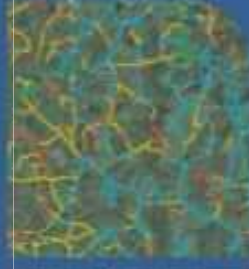


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Network Survey - Regional

- ❑ 13,150 centreline kilometres
- ❑ Rural and Urban local authorities
- ❑ 100% survey
- ❑ RSP, SCRIM, Visual
- ❑ Lane width measurements every 100 metres
- ❑ All to be completed in 2018
- ❑ DTTAS contract administered by RMO

PAVEMENT SURVEY STANDARD FOR REGIONAL AND LOCAL ROADS



Second Edition
February 2018

Survey Equipment

- ❑ Road Condition Data (IRI, Rut & MPD)
 - Road Surface Profiler (RSP)
- ❑ Skidding Resistance Data (SC)
 - SCRIM
- ❑ Digital Video Data (Visual Rating)
 - both RSP (.JPeg) and SCRIM (.Avi)

Condition Parameters

- ❑ IRI – Ride Quality
- ❑ LPV3 – Ride Quality (Bumpiness)
- ❑ Rut Depth – Structural
- ❑ Visual Rating – Overall
- ❑ MPD – Macrotexture (Safety)
- ❑ SC – Microtexture (Safety)

Road Surface Profiler (RSP)

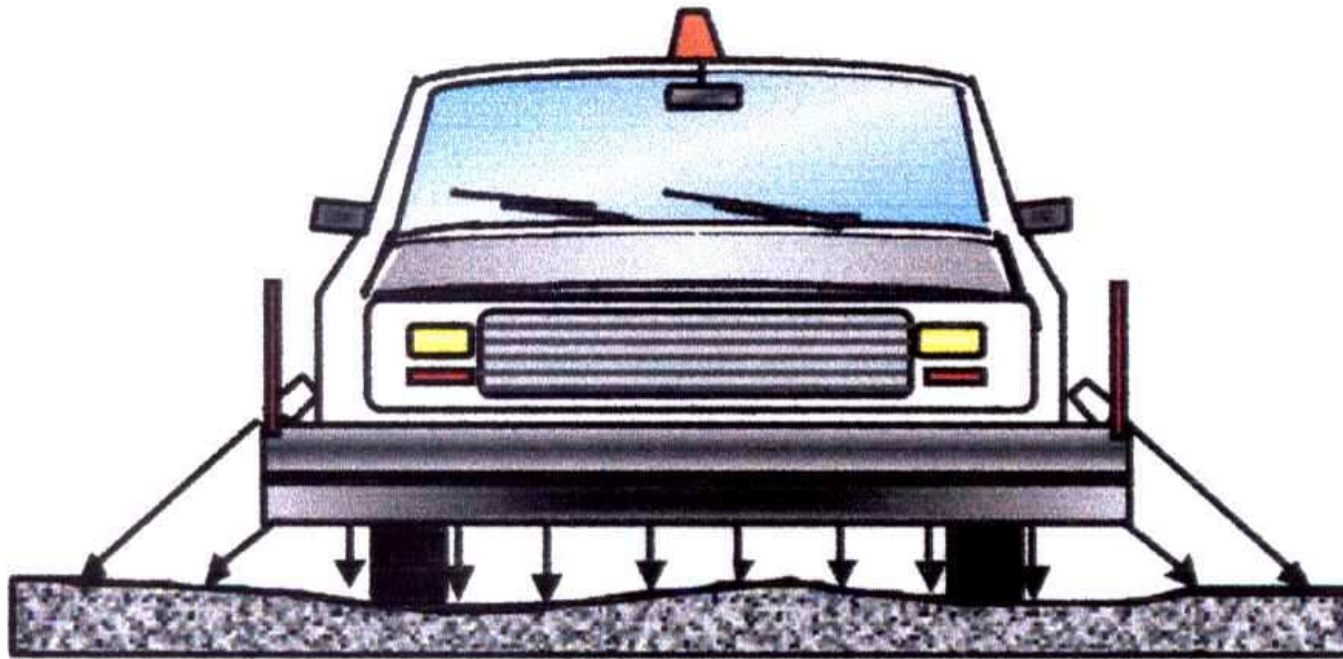
Dynatest Mark III RSP



IRI Relationship with Comfort and Speed

IRI Value	Comfortable Ride Speed	Description
2	over 120 km/h	Very Smooth
4	100 to 120 km/h	Smooth
6	70 to 90 km/h	Perceptible movement
8	50 to 60 km/h	Some Swaying and Wheel Bounce
10	40 to 50 km/h	Significant Swaying
12	30 to 40 km/h	Consistently Rough
14	< 30 km/h	Very Rough

Cross Profile – Rut Depth



Rut Depth

- ❑ Indication of Structural Condition
- ❑ Caused by heavy traffic and/or inadequate pavement strength
- ❑ Rutting can occur in upper layers or in underlying subgrade
- ❑ Measured in both wheelpaths in mm

Skid Resistance

- ❑ Frictional properties of the road surface
 - Measured using a standard device
 - Under standardised conditions
- ❑ Measurements used to
 - Characterise the road surface
 - Assess the need for maintenance
- ❑ Low Speed (< 50 km/h): Microtexture
- ❑ High Speed (> 60 km/h): Macrotexture

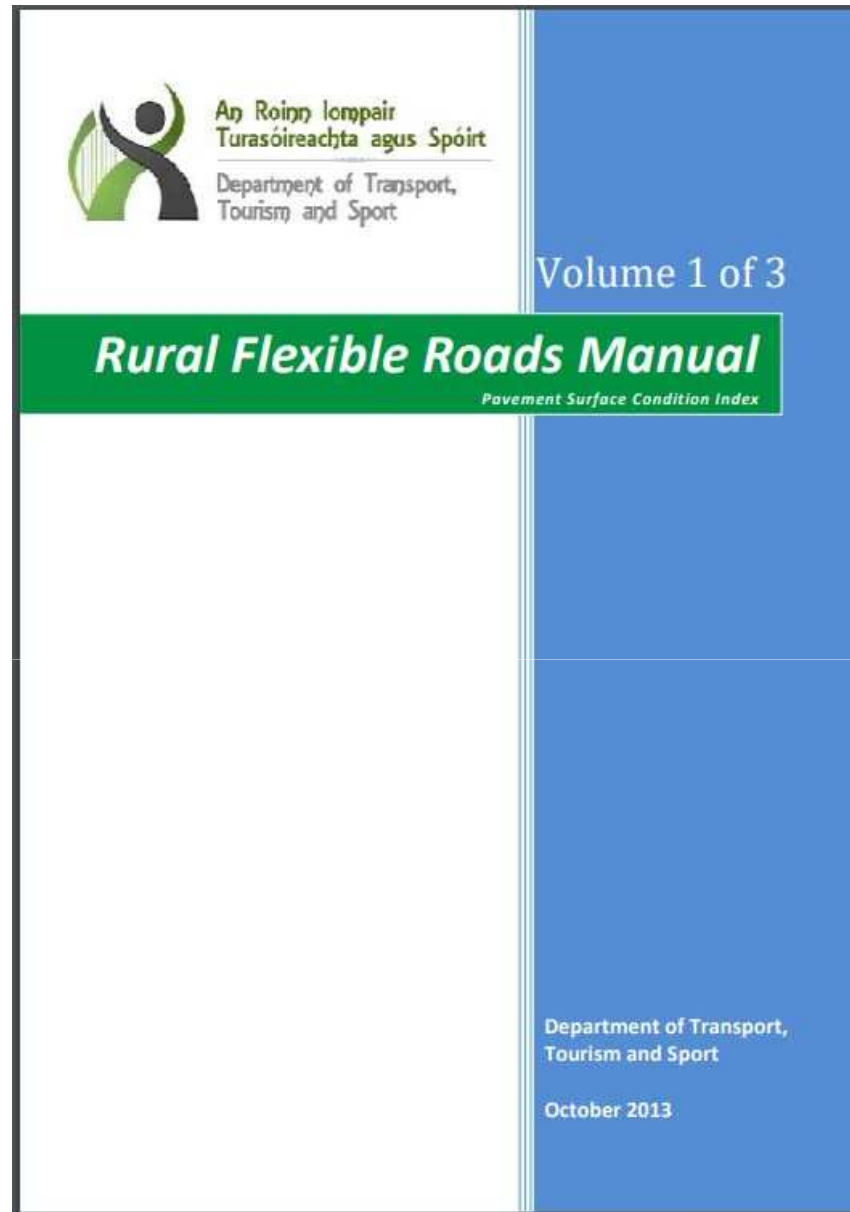
Surface Texture – RSP Laser

- ❑ Measured by High Frequency Laser – 64 kHz
- ❑ Profile Height measured 2.5 times per mm
- ❑ Mean Profile Depth (MPD) in mm calculated
- ❑ Measure of macrotexture (texture depth)

SCRIM



DTTAS Condition Survey Manuals



Visual Rating – Pavement Surface Condition Index (PSCI)

Rating System: 1 to 10

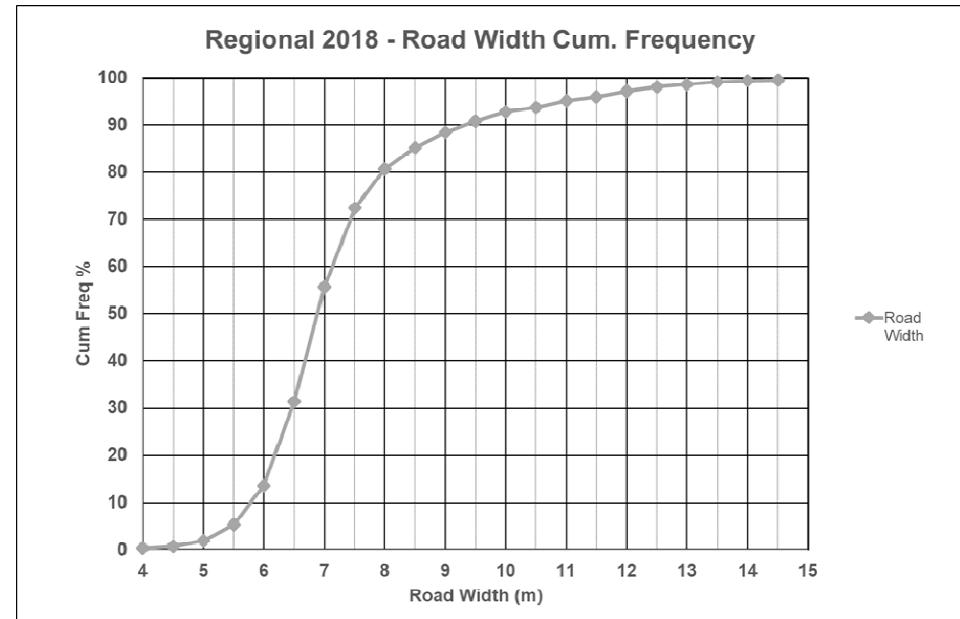
Rating is assigned
based on visible
pavement distress
present.

Overall Rating	Primary Rating Indicators*	Secondary Rating Indicators*
10	No visible defects.	Road surface in perfect condition, like new.
9	Less than 10 % of surface with surface defects ¹	Road surface in very good condition.
8	10% to 30% of surface with surface defects ¹	Little or No Other defects.
7	Greater than 30% of surface with surface defects ¹	Little or No Other defects. Old surface with aged appearance.
6	Less than 20% of Other Cracking ² may be present. Patching generally in good condition. May be out of shape requiring some reduction in driver speed.	Surface defects ¹ may be present. No structural distresses ³
5	Greater than 20% Other Cracking ² present. Patching generally in fair condition. Out of shape requiring reduction in driver speed. Very localised structural distress ³ (< 5 sq.m of surface) may be present.	Surface defects ¹ may be present.
4	Structural distress ³ present. Rutting or Alligator Cracking for 5% to 25% of surface. Short lengths of Edge Breakup/Cracking. Small number of Potholes.	Other defects may be present.
3	Significant areas of Structural distress ³ . Rutting or Alligator Cracking for 25% to 50% of surface. Significant continuous lengths with Edge Breakup/Cracking. Frequent Potholes.	Other defects may be present.
2	Large areas of Structural distress ³ . Rutting or Alligator Cracking for over 50% of surface. Severe Rutting (over 75 mm deep). Extensive Patching in very poor condition. Many Potholes.	Very difficult to drive on.
1	Severe Structural distress ³ with extensive loss of pavement surface. Road Disintegration of surface. Many large and deep Potholes. Patching in failed condition.	Severe Deterioration Virtually undriveable.

County	Length (km)	
CARLOW	185	
CAVAN	400	
CLARE	633	
CORK	1368	*
CORKCC	37	*
DCC	200	
DLR	103	
DONEGAL	782	
FINGAL	254	*
GALCC	37	*
GALWAY	894	*
KERRY	529	
KILDARE	493	
KILKENNY	421	
LAOIS	348	
LEITRIM	332	
LIMERICK	531	
LONGFORD	151	*
LOUTH	274	*
MAYO	623	
MEATH	575	
MONAGHAN	297	
OFFALY	392	
ROSCOMMON	375	
SLIGO	235	
STHDUB	116	
TIPPERARY	894	*
WATERFORD	425	
WESTMEATH	313	
WEXFORD	475	
WICKLOW	460	
	13150	

COUNTY	Avg Of Road Width (m)
CARLOW	7.30
CAVAN	6.91
CLARE	6.77
CORK	7.11
CORKCC	9.35
DCC	10.19
DLR	8.71
DONEGAL	6.69
FINGAL	7.96
GALCC	9.15
GALWAY	7.09
KERRY	6.79
KILDARE	7.90
KILKENNY	7.34
LAOIS	7.60
LEITRIM	6.79
LIMERICK	7.20
LONGFORD	6.82
LOUTH	7.91
MAYO	6.72
MEATH	7.60
MONAGHAN	7.10
OFFALY	7.10
ROSCOMMON	6.96
SLIGO	6.92
STHDUB	9.12
TIPPERARY	7.34
WATERFORD	7.39
WESTMEATH	7.51
WEXFORD	7.08
WICKLOW	6.86

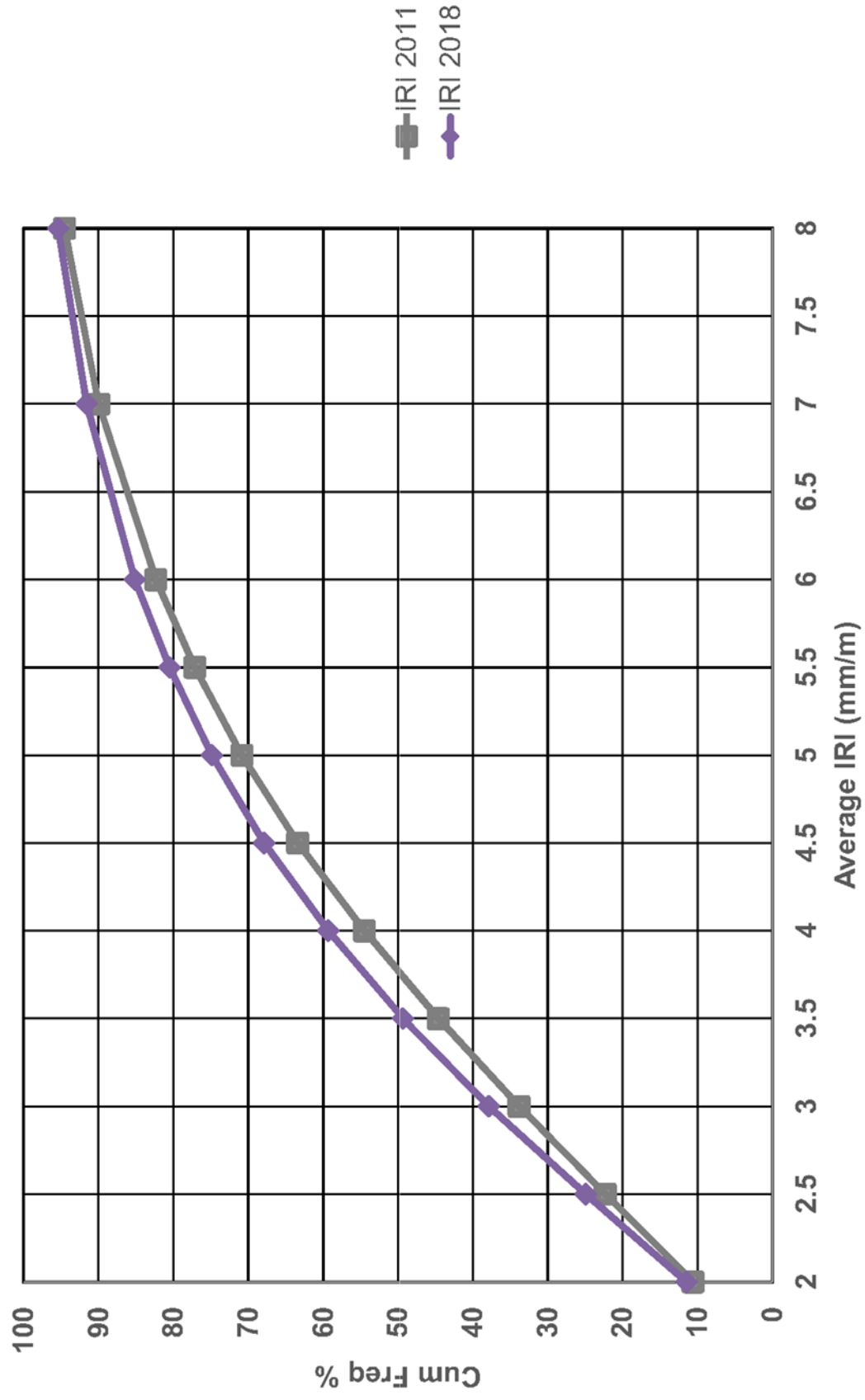
National Average: 7.5 m



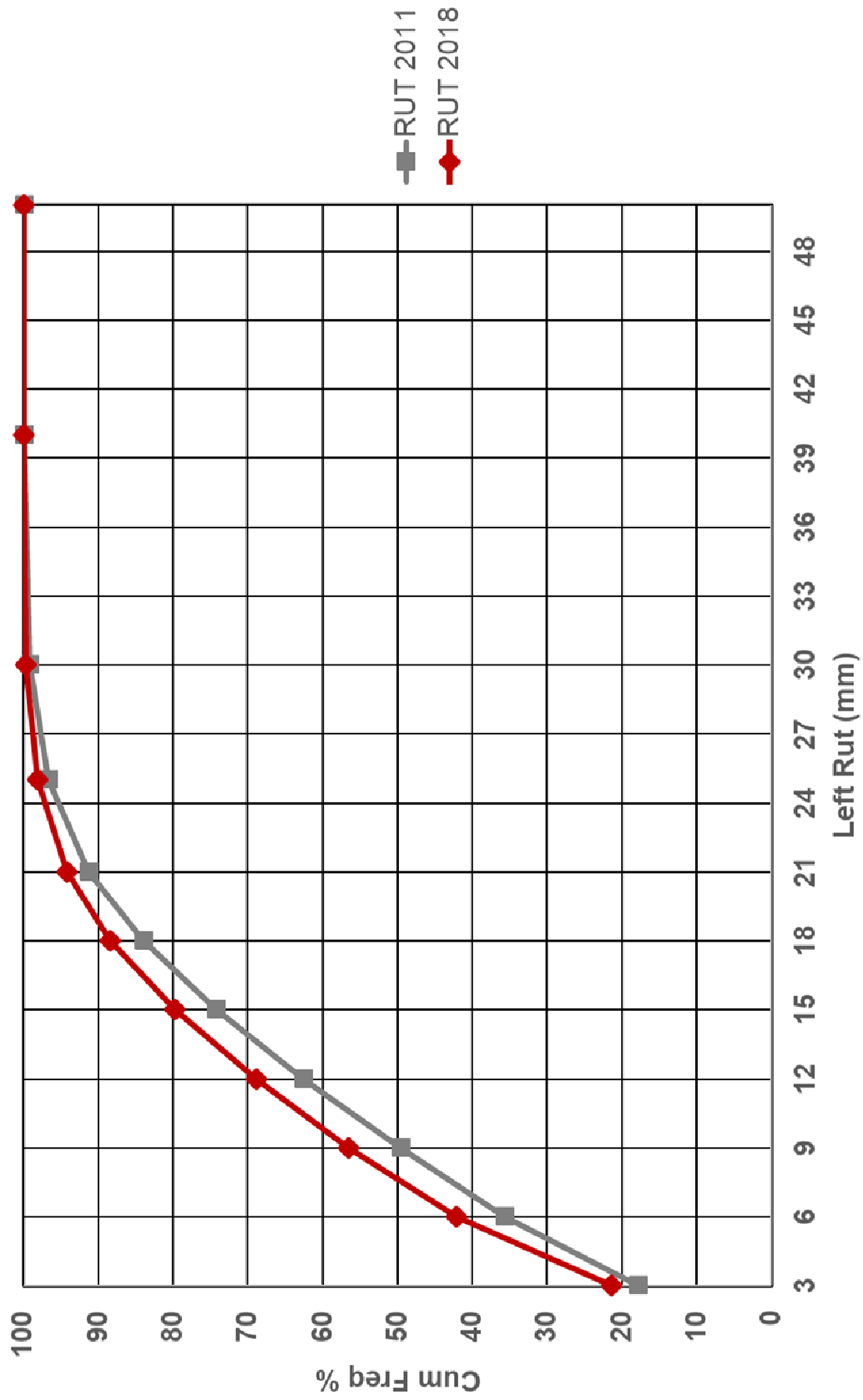
2018 Regionals National Average Values

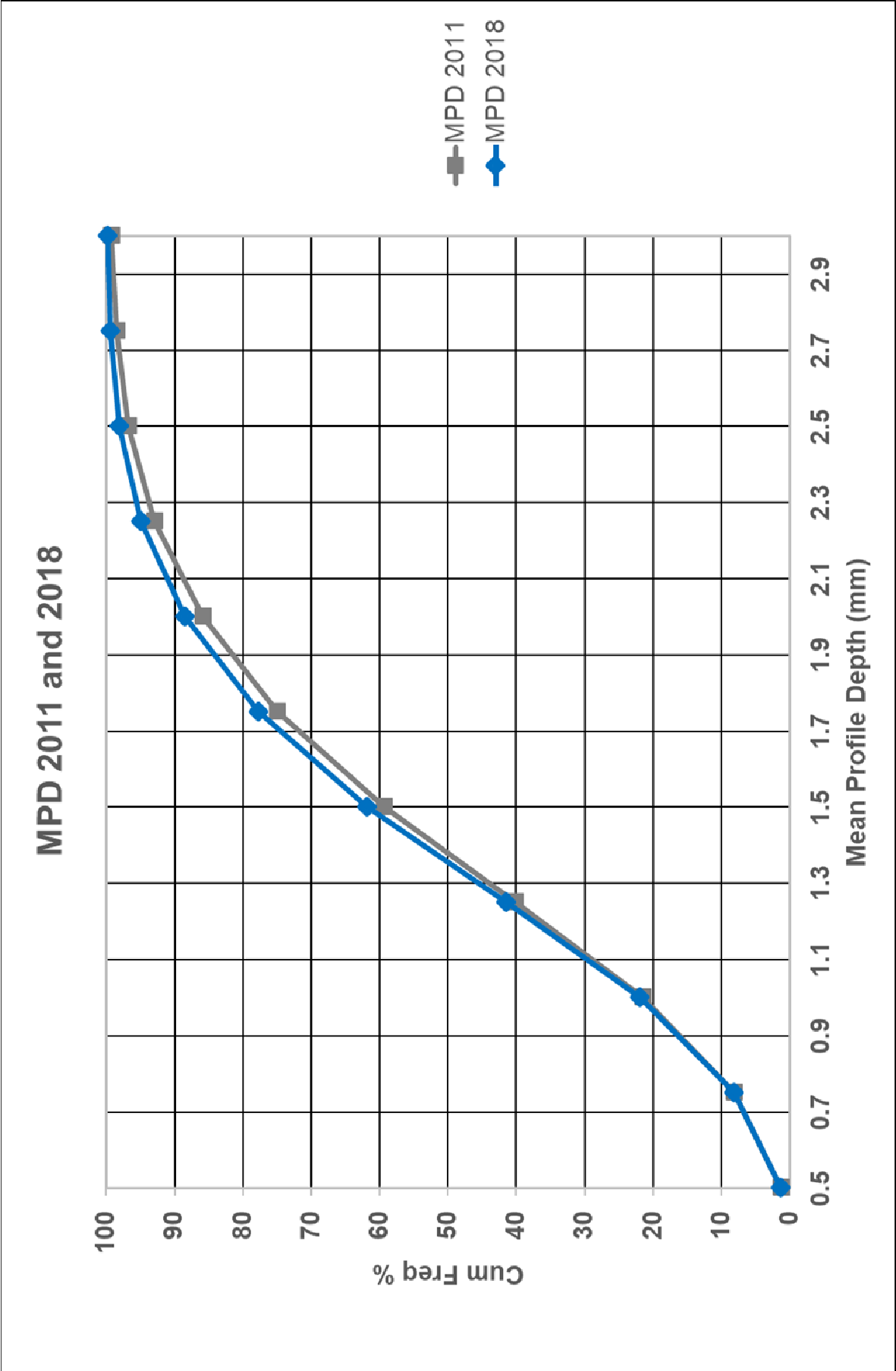
Parameter	Average
IRI (mm/m)	4.0
Left Rut (mm)	9.2
MPD (mm)	1.4
CSC	0.5
Visual Rating	7.4
LPV 3m	3.7

Average IRI 2011 and 2018

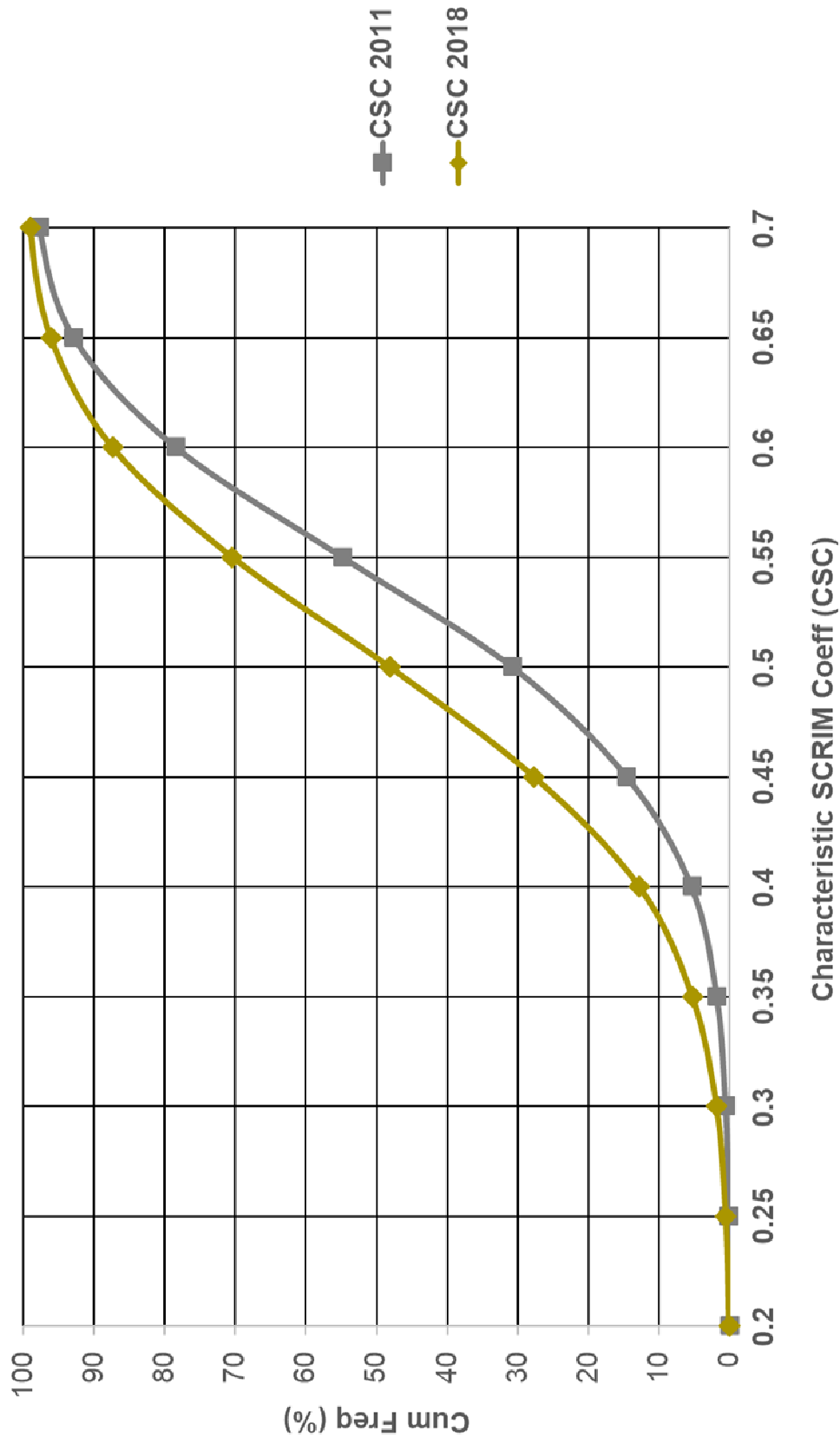


Left Rut 2011 and 2018

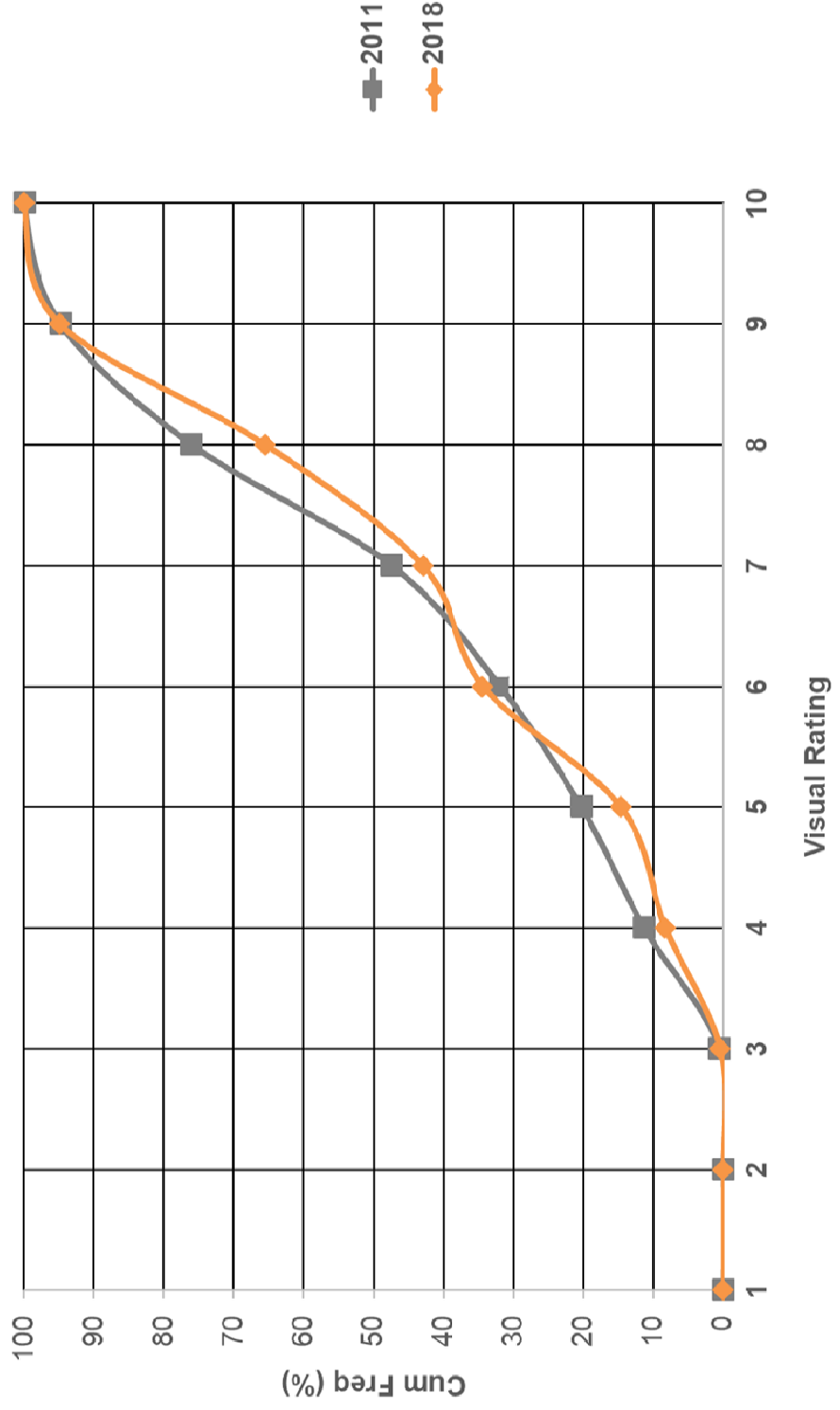




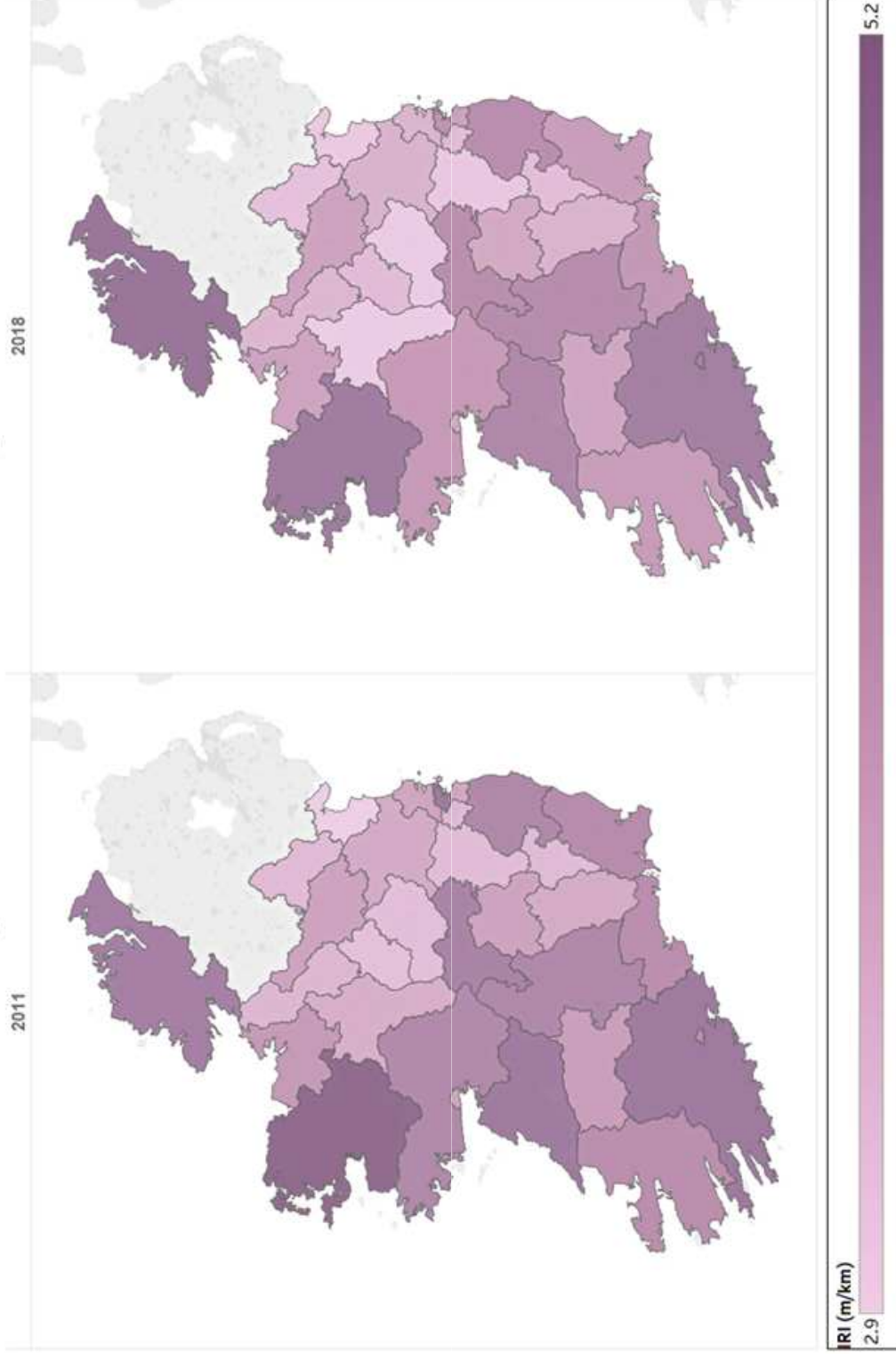
CSC 2011 and 2018



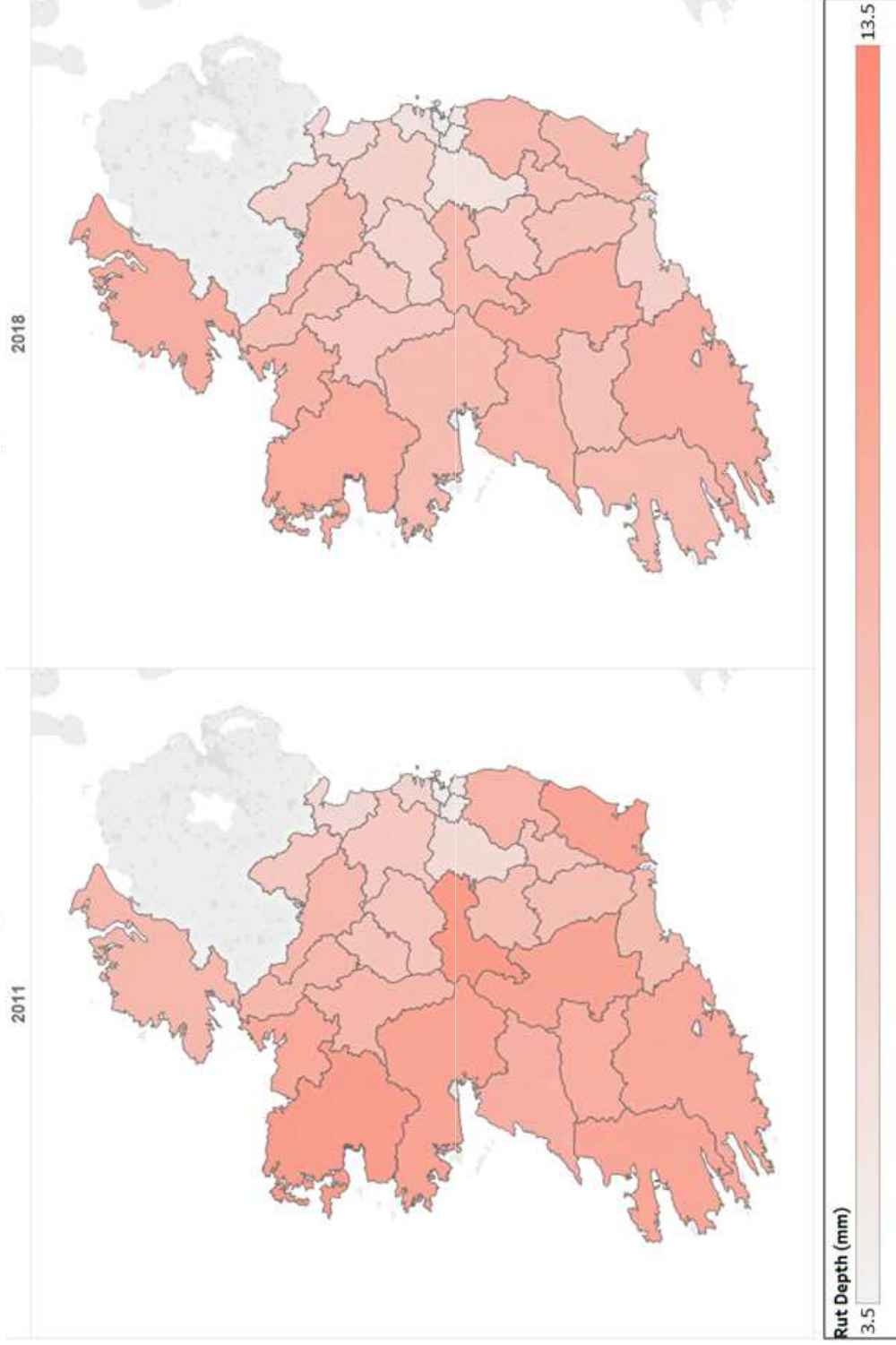
Visual Rating 2011 and 2018



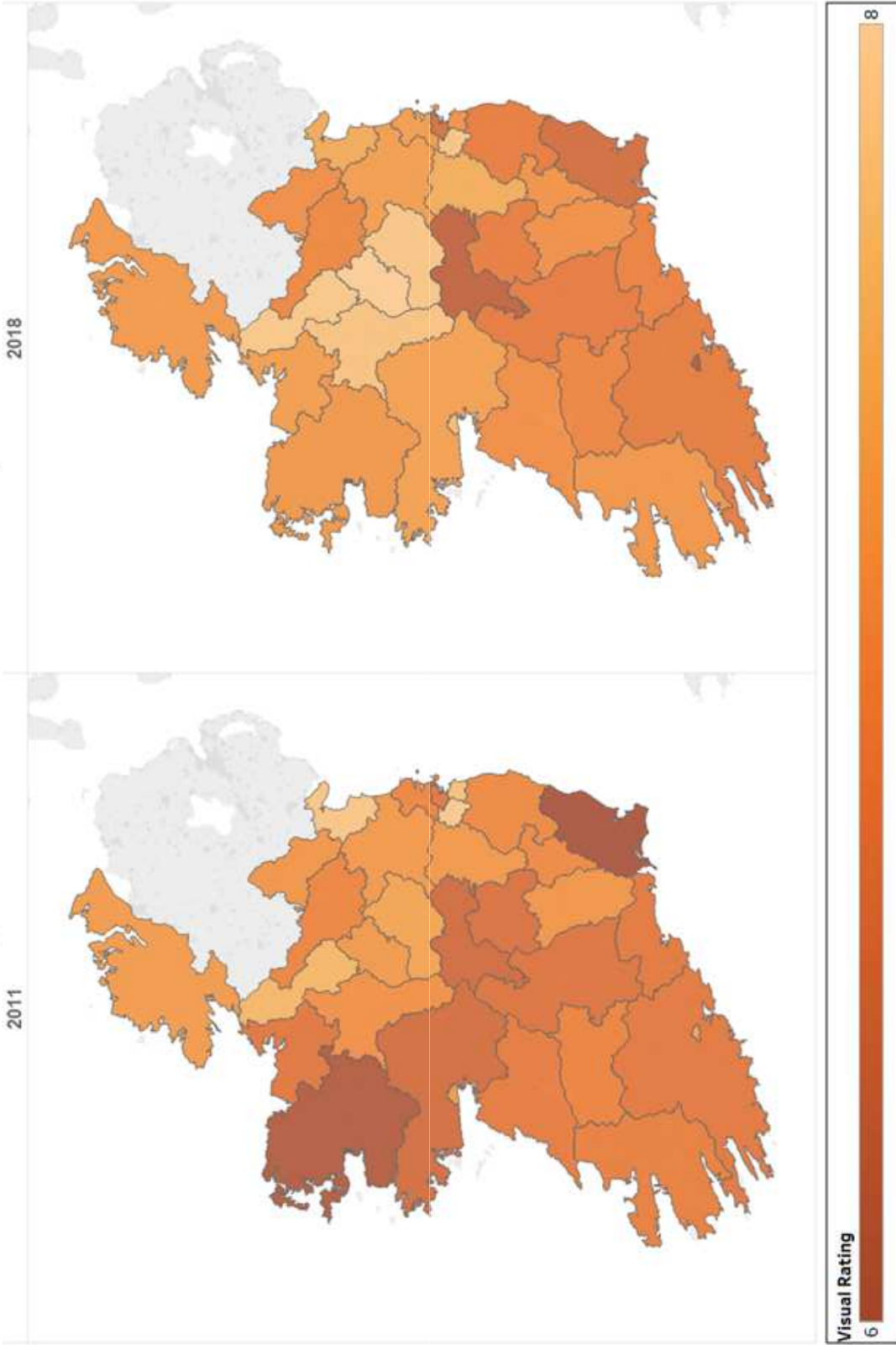
Regional Road 2011 - 2018 Condition Summary - IRI



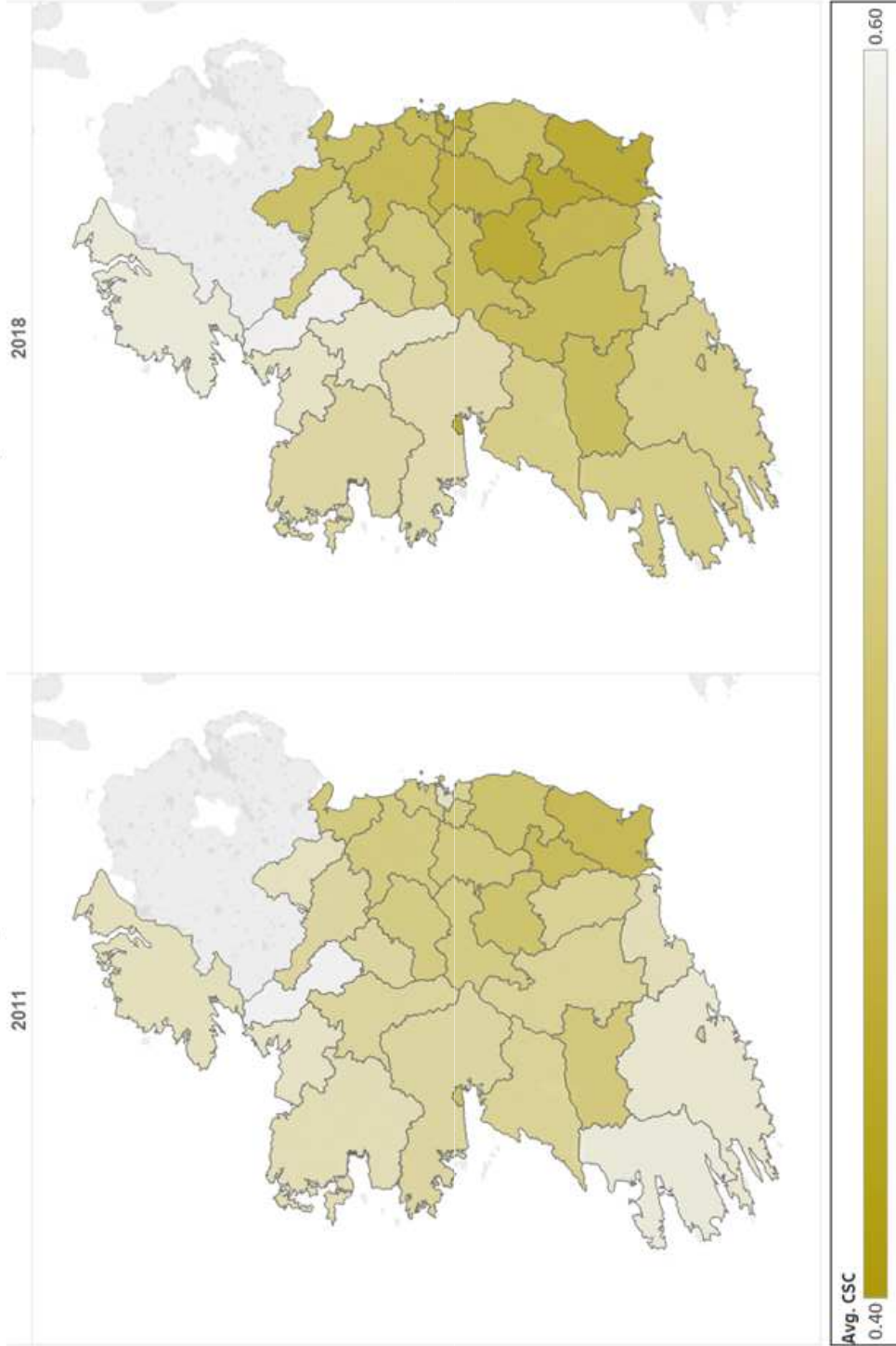
Regional Road 2011 - 2018 Condition Summary - Rut



Regional Road 2011 - 2018 Condition Summary - Visual



Regional Road 2011 - 2018 Condition Summary - CSC



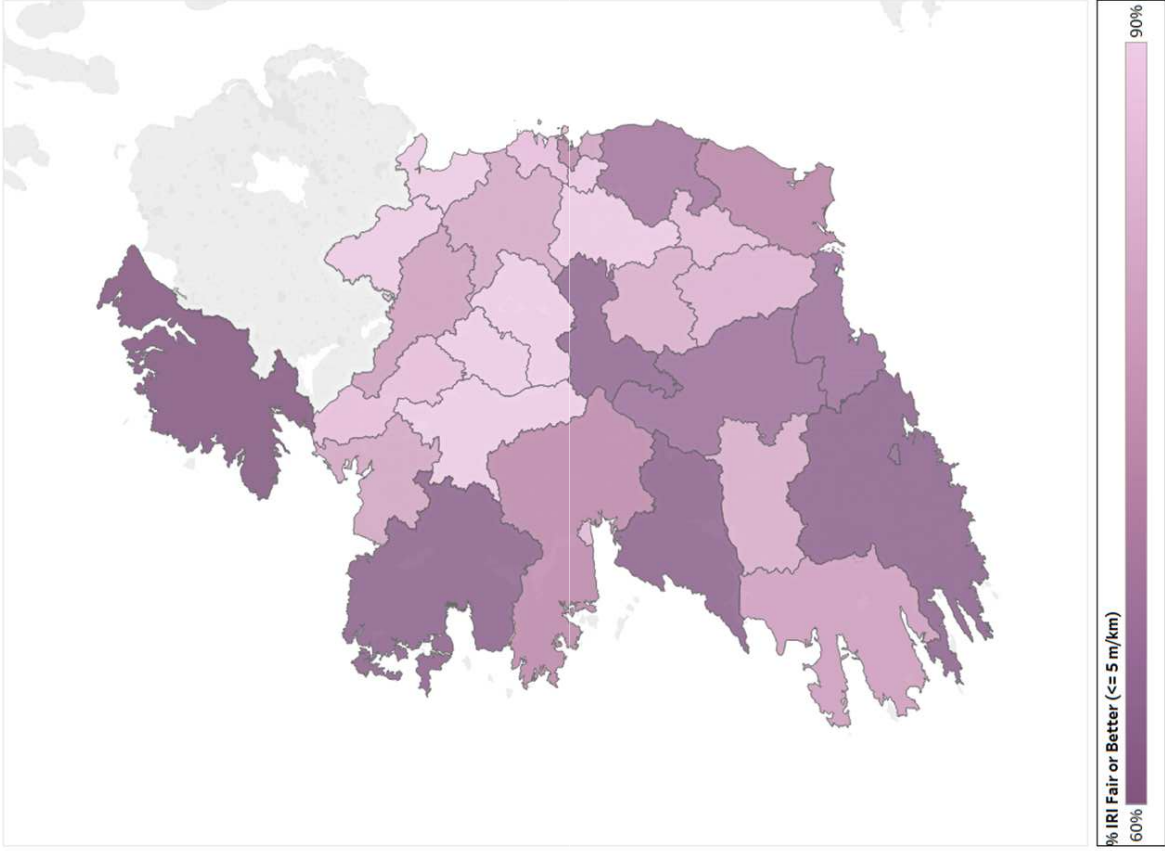
Condition Classes for each Parameter

- ❑ Very Good, Good, Fair, Poor, Very Poor
- ❑ Qualitative
- ❑ Easier to Understand and Explain
- ❑ Can be used for Key Performance Indicators
- ❑ Best Practice Internationally
- ❑ Typically report on % Fair or Better

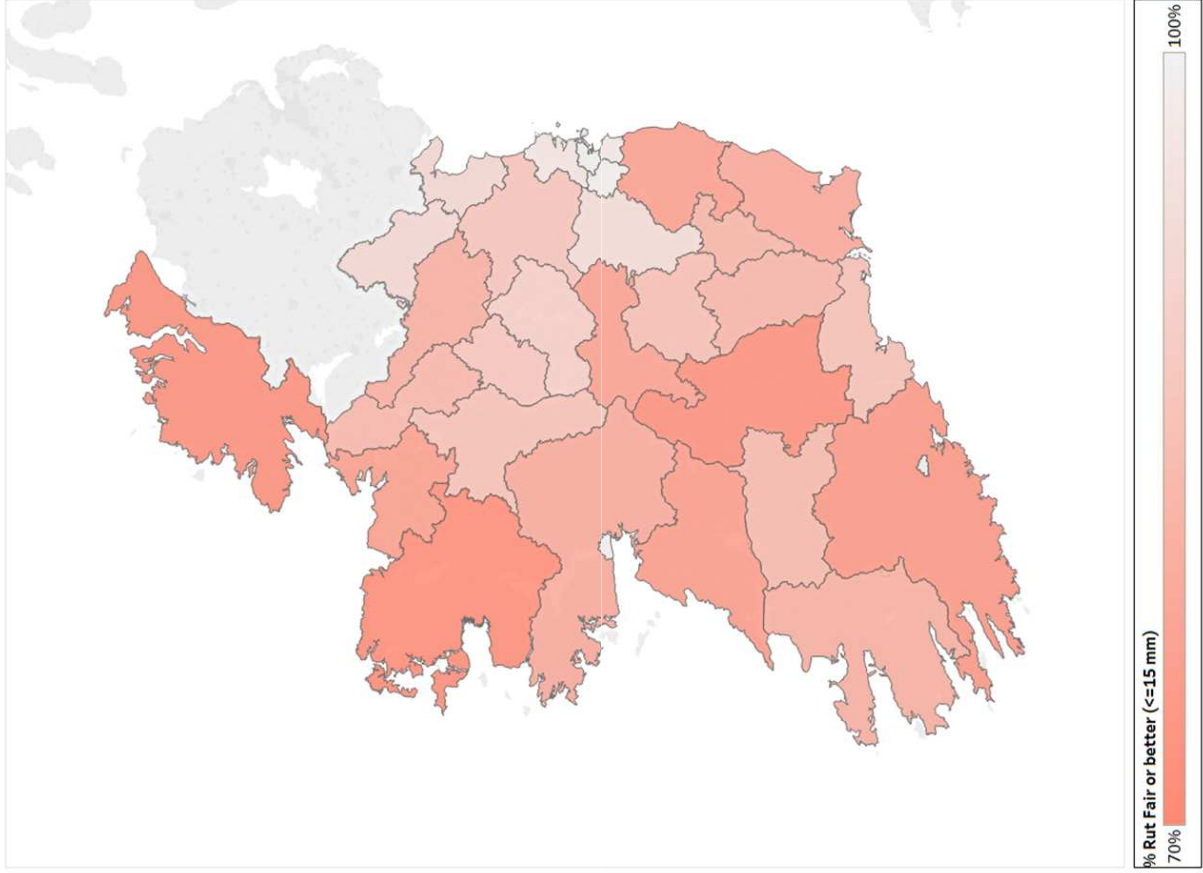
Condition Class Definitions

Condition Class	Very Good	Good	Fair	Poor	Very Poor
IRI (m/km)	< 3	3 - 4	4 - 5	5 - 7	> 7
Rut (mm)	< 6	6 - 9	9 - 15	15 - 20	> 20
CSC	> 0.5	0.45 - 0.50	0.40 - 0.45	0.35 - 0.40	<= 0.35
LPV 3M	< 2	2 - 4	4 - 7	7 - 10	> 10

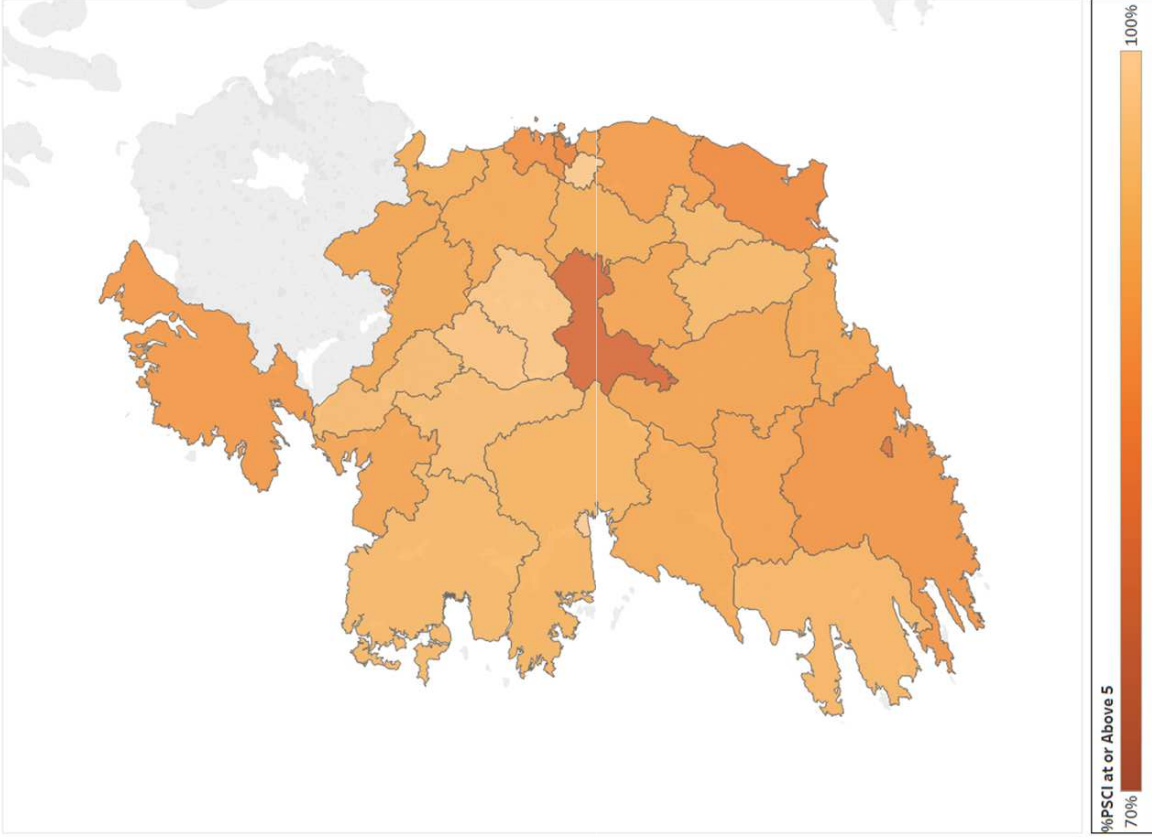
Regional Road 2018 - IRI (% Fair or Better)



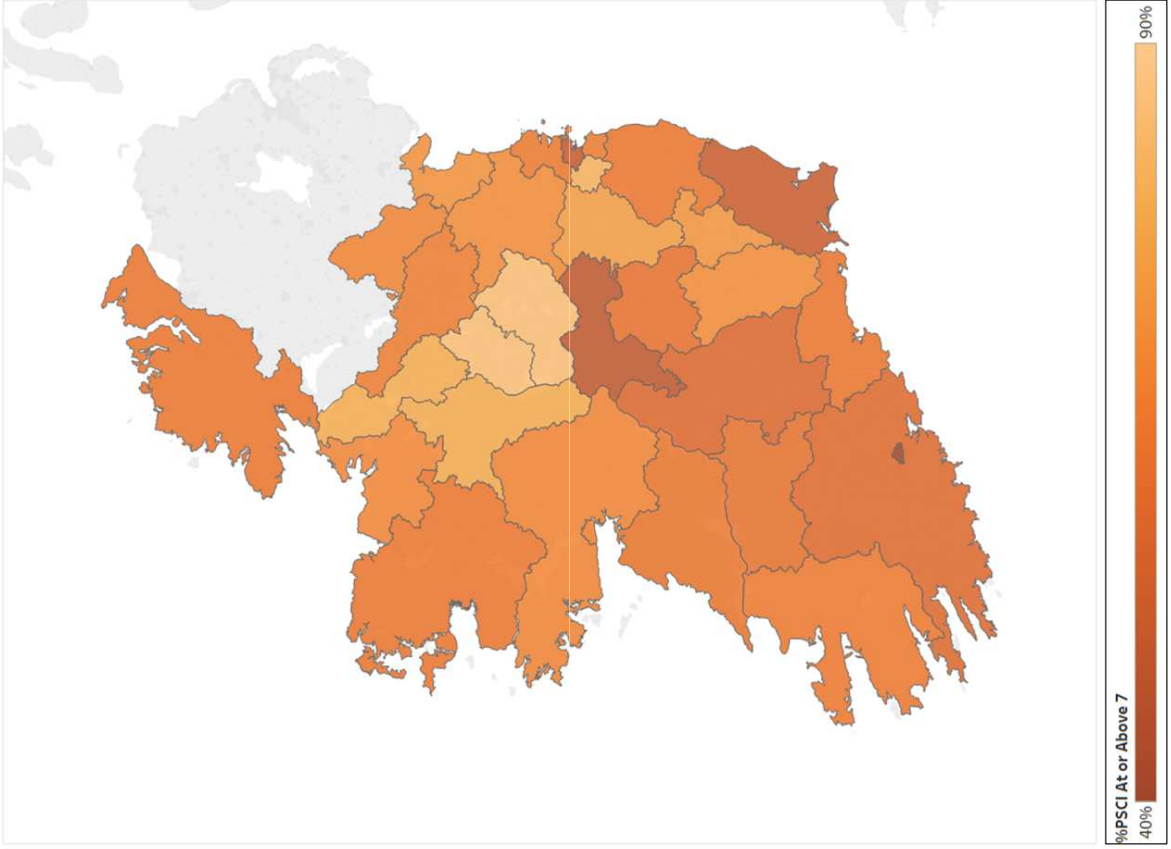
Regional Road 2018 - Rut (% Fair or Better)



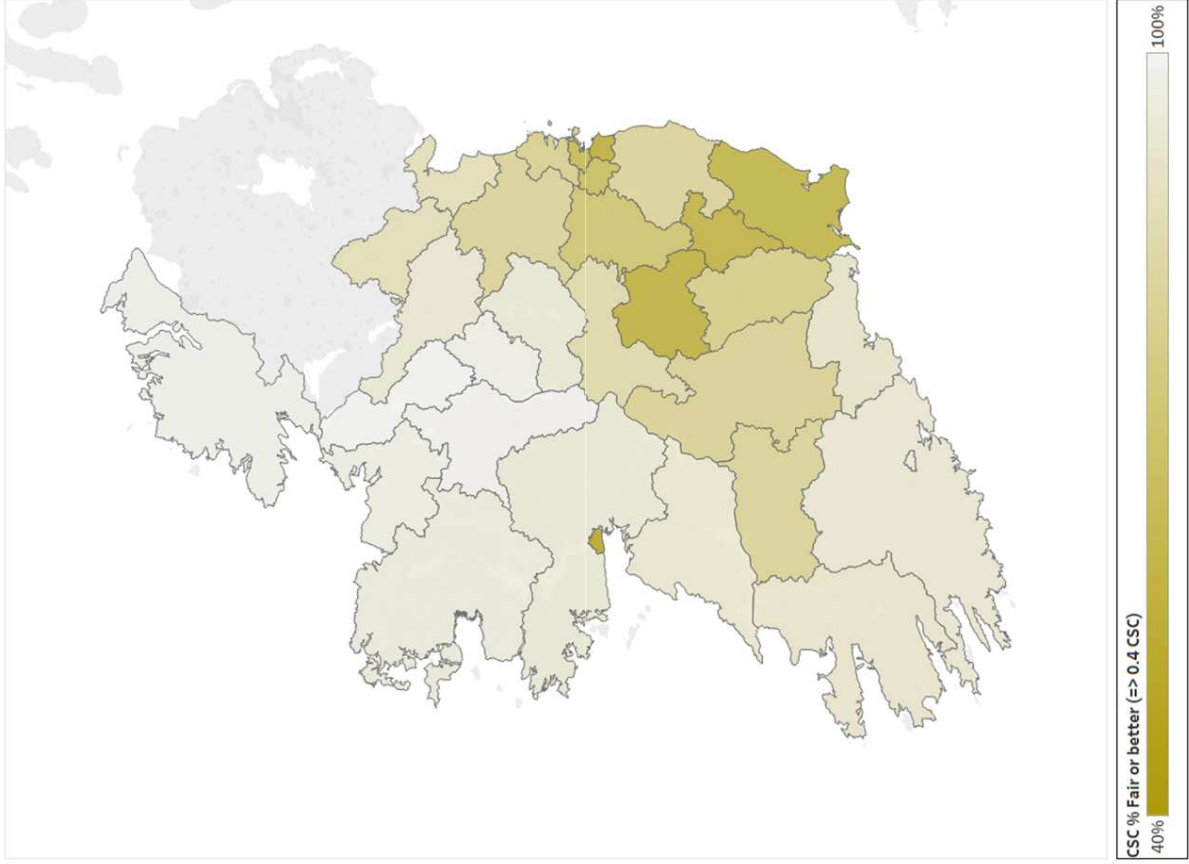
Regional Road 2018 - PSCI (% at or above 5)



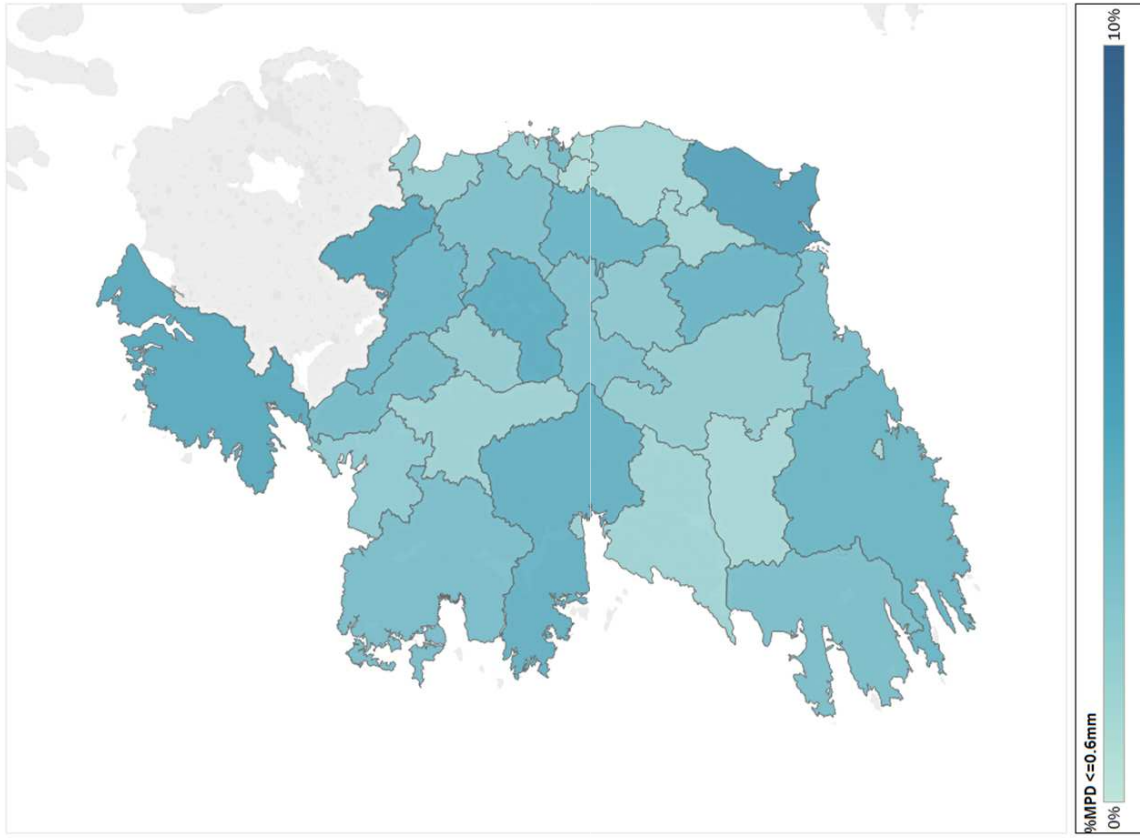
Regional Road 2018 - PSCI (% at or above 7)



Regional Road 2018 - CSC (% Fair or Better)



Regional Road 2018 - MPD (% <= 0.6mm)



Outturn Condition Parameters

- ❑ IRI – Ride Quality
- ❑ Rut Depth – Structural
- ❑ Visual Rating – Overall
- ❑ MPD – Macrotexture (Safety)
- ❑ SC – Microtexture (Safety)
- ❑ Reported for every 100 metre sample unit on the entire Regional road network.

TABLE A1: TREATMENT / WORKS TYPE CATEGORIES AND CODES WITH CURRENT PERMITTED GRANTS

PSCI Rating	Pavement Treatment / Works Type	Treatment Code	Permitted Grant
10	Routine Maintenance	na	DG
9			
8	Resealing and Restoration of Skid Resistance	RS (or SD)	CI, RM, DG
7			
6	Surface Restoration Carry out localised repairs and treat with surface treatment or thin overlay Works can include combinations of: - <i>Pothole Repair (PR)</i> ; <i>Edge Repair (ER)</i> ; <i>Drainage Works (D)</i> and <i>Surfacing</i>	SR	CI, RI, DG
5			
4	Structural Rehabilitation Structural Overlay / Inlay (Urban)	SO / SI	CI, RI, SG, DG
3			
2	Road Reconstruction	RR	CI, RI, SG, DG
1			

Mapping Parameters to Treatments

Road Reconstruction

- IRI > 12

or

- Left Rut Depth > 40 mm

or

- Visual Rating of 1 or 2

Mapping Parameters to Treatments

Structural Overlay

- IRI between 7 and 12 mm/m

or

- Left Rut Depth between 20 and 40 mm

or

- Visual Rating of 3 or 4

Mapping Parameters to Treatments

Surface Restoration

Visual Rating of 5 or 6

Also

Visual Rating of 7 to 10

and

IRI between 6 and 7 mm/m

Mapping Parameters to Treatments

Restoration of Skid Resistance

Visual Rating of 7 or 8

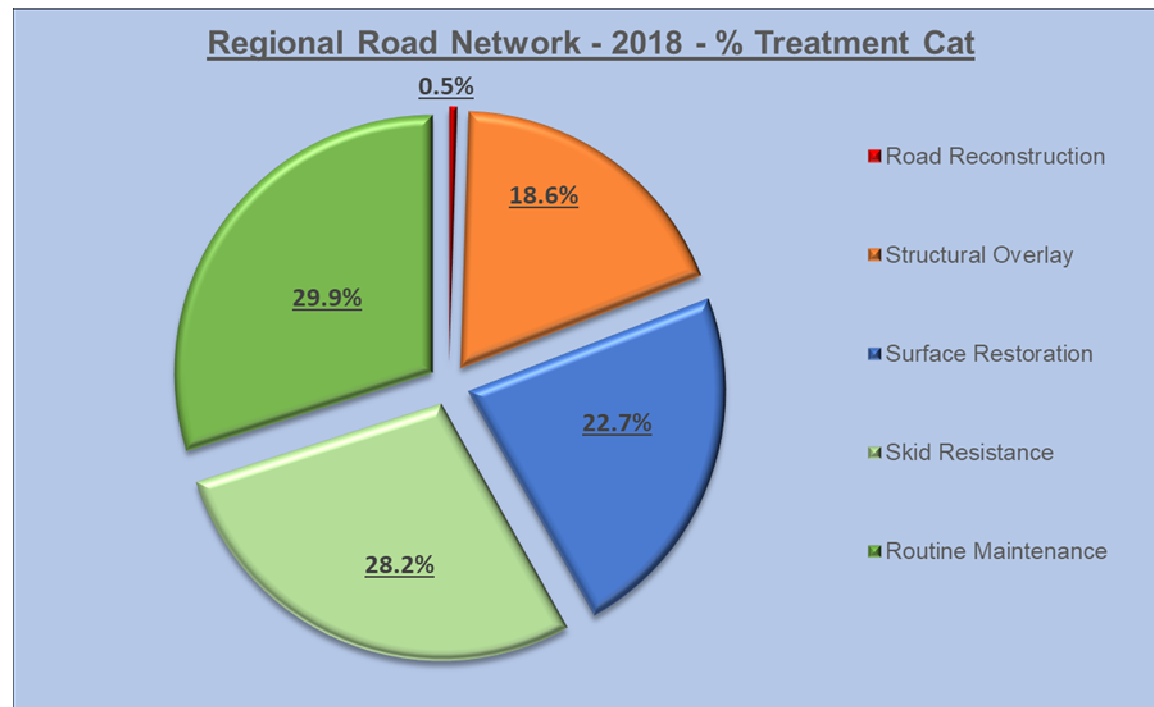
Also

Visual Rating of 9 or 10

and

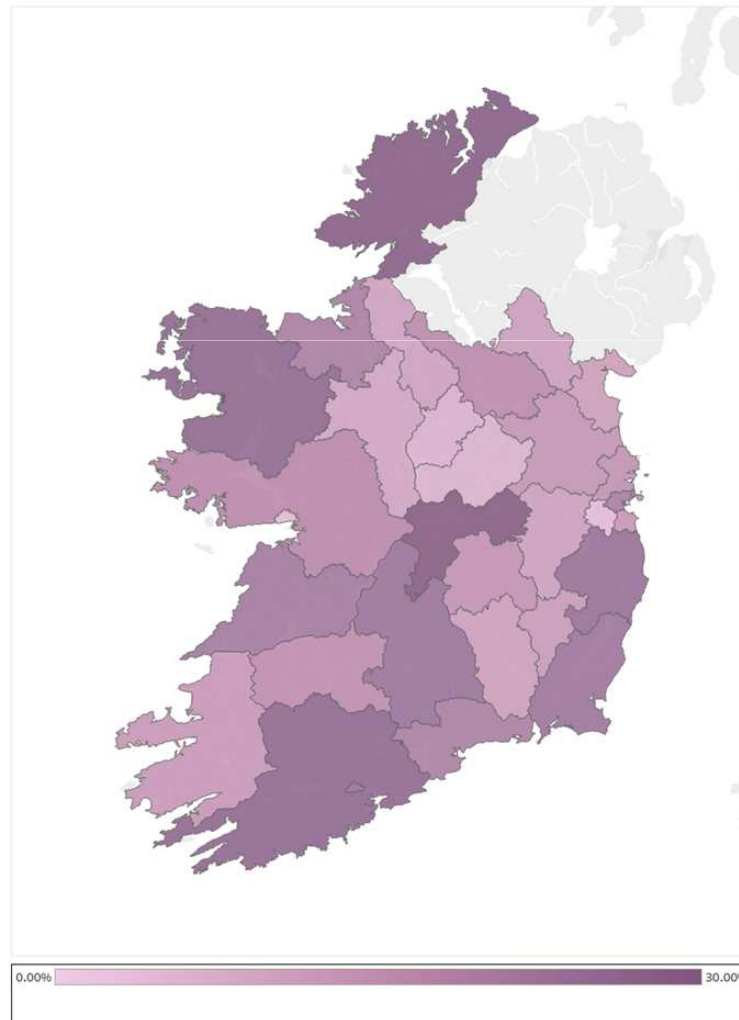
(MPD \leq 0.6 mm OR SC \leq 0.3)

Treatment Categories - National



Categories by Local Authority

Percentage of Regional Network requiring Structural Rehabilitation



Summary

- ❑ 13,150 km of Regional Road Surveyed in 2018
- ❑ Comparisons with 2011 study
- ❑ New – Class Definitions for Parameters
- ❑ Maintenance Treatment Categories from Machine Survey and Visual Survey combined
- ❑ All Data loaded into MapRoad
- ❑ Reporting at National and Local level

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Pavement Surveys - Overall

□ Other Steps

- Local Roads Study
- Pavement Survey Standard
- Grant Return Analysis
- Pavement Management Review

Pavement Surveys - Overall

□ Local Roads Study

- Sample Survey previously carried out as part of 1994/5 and 2004/5 surveys
- Not for 2011 and 2018 surveys
- Proposal to carry out a sample survey for 2019 but also utilising the significant amount of machine and visual data on the MapRoad system (something that was not there previously).

Pavement Surveys - Overall

- Pavement Survey Standard
 - Prepared in conjunction with RMO, LAs and PMS
 - Implemented in 2018 (RW 6/2018)
 - Continues on from previous (RW 21/2014)
 - Other circulars back to 2012
 - Visual (PSCI) and Machine Survey / Data requirements (parameters / frequency etc.)
 - History of Works
 - Surface Inventory
 - Data Quality Requirements – big issue

Pavement Surveys - Overall

- Grant Return analysis
 - Restoration Improvement
(Annual and 3-year)
 - Restoration Maintenance

 - Compliance and Quality Check
 - Condition versus Works
 - Geometric Checks

 - Issues arising - check data and contact DTTAS Inspector and RMO for assistance.

Pavement Surveys - Overall

□ Pavement Management Review

- Progress to date
 - MapRoad / RMO
 - Data gathering
 - Linking to works
- International Practice
- Define issues arising
- Next steps (5 years)

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