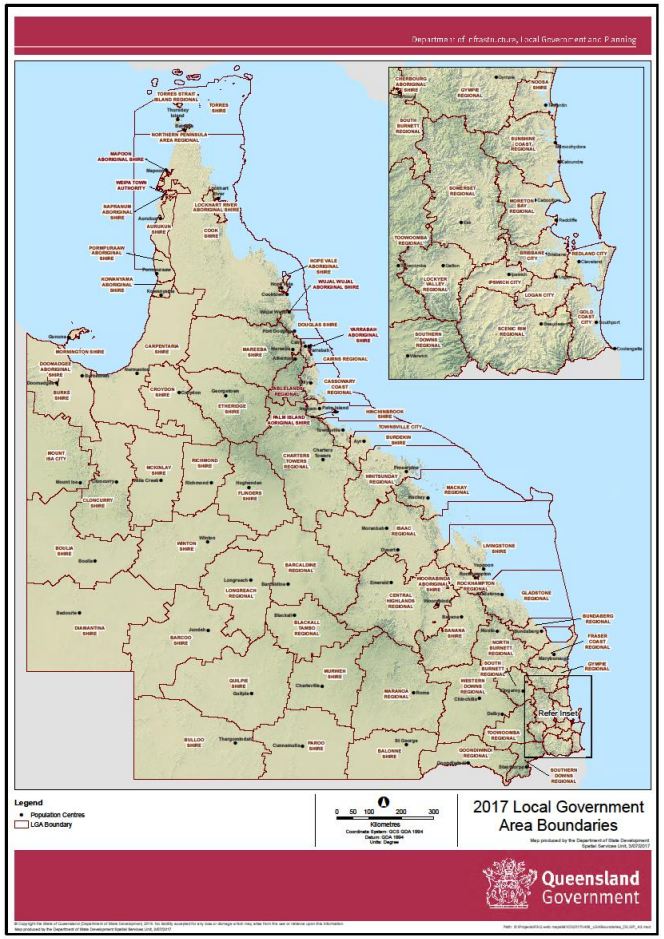
Unsealed Road Service Levels Implementation 2019

Version 1.0

By David Bremert and Darren Shepherd

Where is Rockhampton



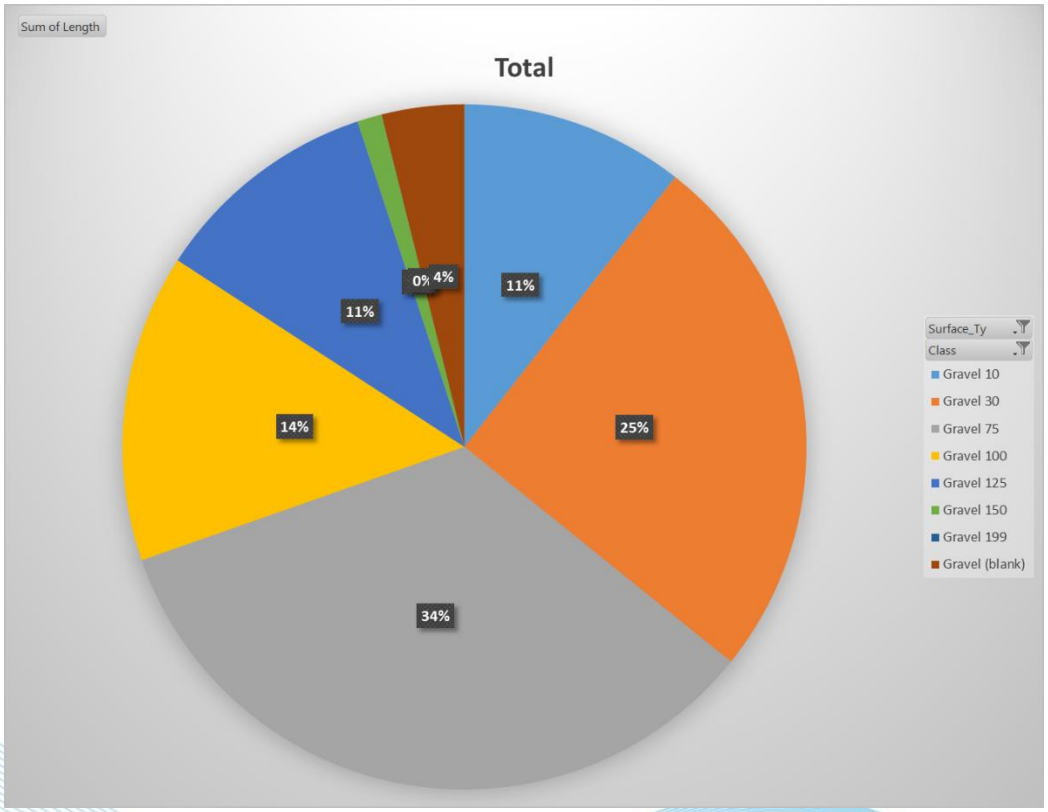
- Population 83,000
- Rockhampton – 62,000
- Gracemere – 11,600
- Mt Morgan – 2,400

- With our rural area being 7,000
- Note based on 2016 data

Network Summary

Approximately **1065km** of unsealed roads.

Type	Class	Sum of Length	%
Gravel	10	112,597	11%
Gravel	30	268,523	25%
Gravel	75	360,558	34%
Gravel	100	154,828	15%
Gravel	125	114,738	11%
Gravel	150	12,303	1%
Gravel	199	43	0%
Gravel	(blank)	41,543	4%
Grand Total		**1,065,132**	



Council's roads are grouped into classes that help relate services to, they are as follows;

Pavement - Op class 10 (average traffic volume <10)
Pavement - Op class 30 (average traffic volume 10-30)
Pavement - Op class 75(average traffic volume 30-75)
Pavement - Op class 100 (average traffic volume 75-100)
Pavement - Op class 125 (average traffic volume 100-125)
Pavement - Op class 150 (average traffic volume 125-150)
Pavement - Op class 199 (average traffic volume 150-199)
Pavement - Op class Unassigned

Old method

- Rural co-ordinator use to drive the roads
- Resources moved to rough roads

- Council received complaints about favouritism and not being consistent.
- Old method not defendable.

- This method lasted 30 years

Common components of Unsealed Roads and the Services they provide to End Users

- *Roads Components*
  - *Running Surface* is the top wearing course of the pavement. This is the part that is **graded** to ensure it is smooth.
  - *Gravel Pavement* is the structural part of the asset and gives vehicles access in wet weather . Depending on depths (100mm will last 6 to 9yrs dependant on traffic volume) (**resheeting**)
  - *Formation* (earthworks/Natural material)is protected by the pavement when available
  - *Table and Diversion Drains* keeps water off the surface and pavement to avoid water damage to roads

Figure 1.Formed and Gavelled Road

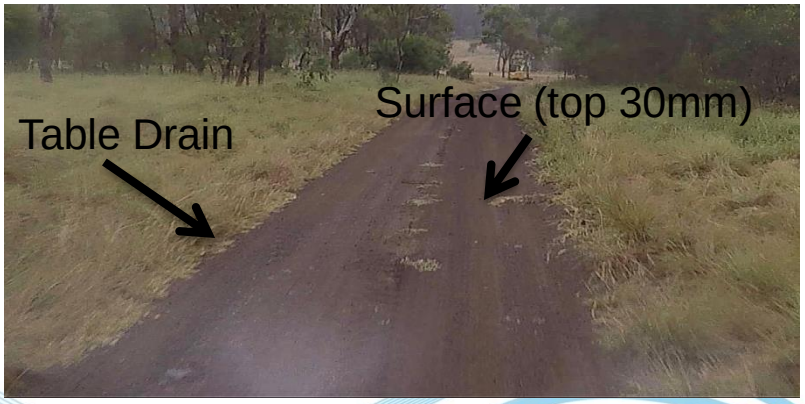


Figure 2. Formed Road (No Gravel)

Level of Service Provided by Council

A. ***Providing a smooth running surface so vehicles can travel from one location to another safely and cost effectively while only grading roads when required.***

B. ***Providing wet weather access by providing gravel sheeting so that vehicles can travel from one location to another after a significant rain event***

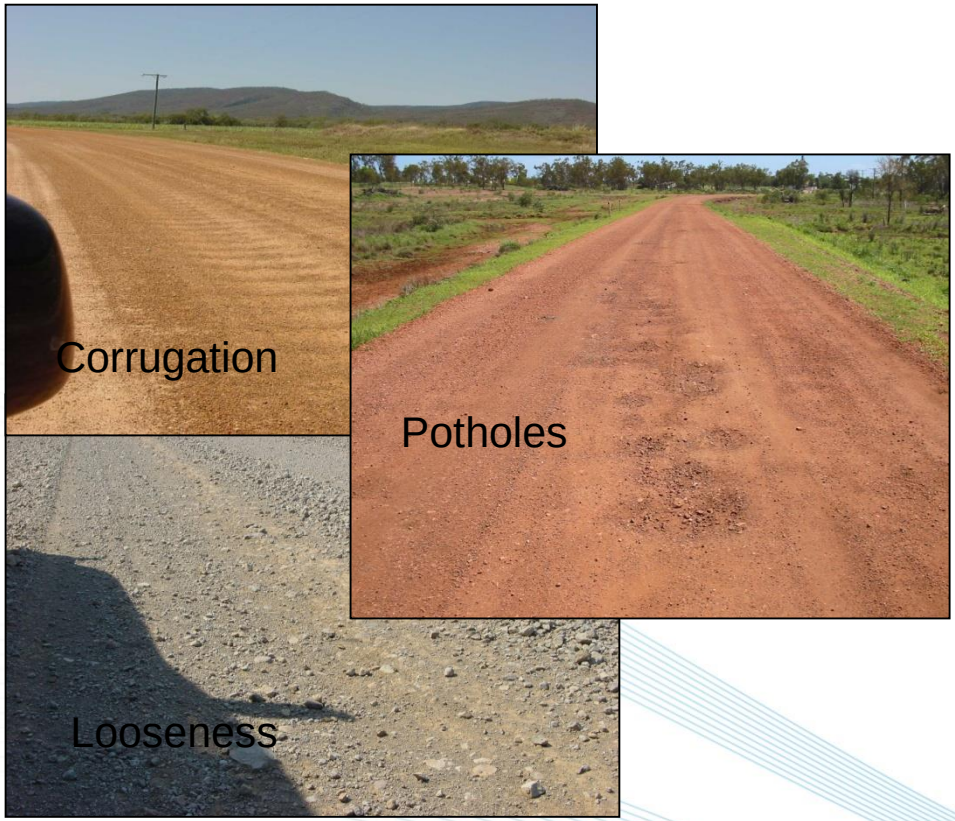
C. ***Repair high priority defects within a timely manner***.

Service Level (a) – A Smooth Running Surface

MEASURED IN TERMS OF HOW ROUGH THE ROAD IS BEFORE WE ENGAGE GRADING

Running Surface Condition-How Rough does the Road Need to Be before Grading is engaged

Road Condition defects at Intervention (examples only)



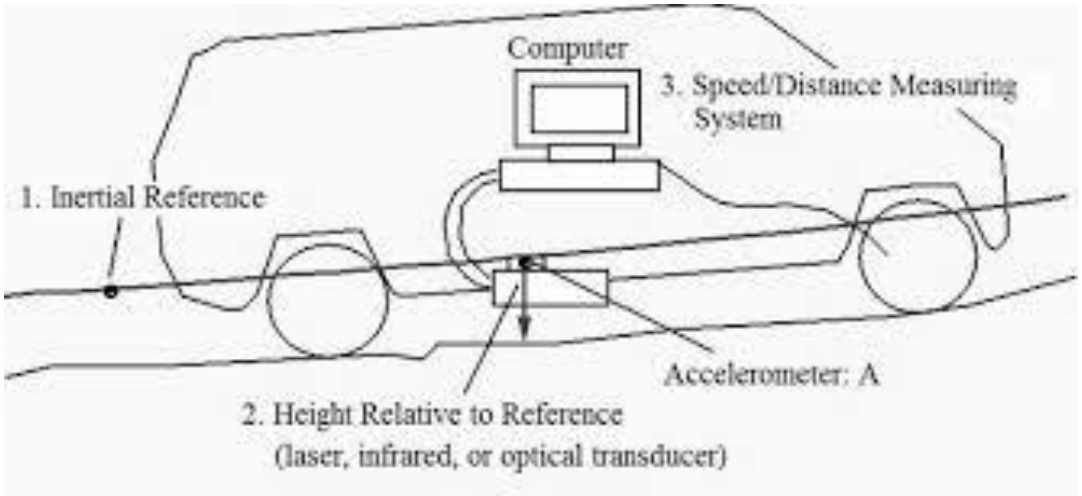
Grading Works (Service Activity)

Initial Use of RACAS

- River Road – Damage from Cyclone Debbie

- Nine Mile Road showing isolated tree over road

Rockhampton RACAS Machine



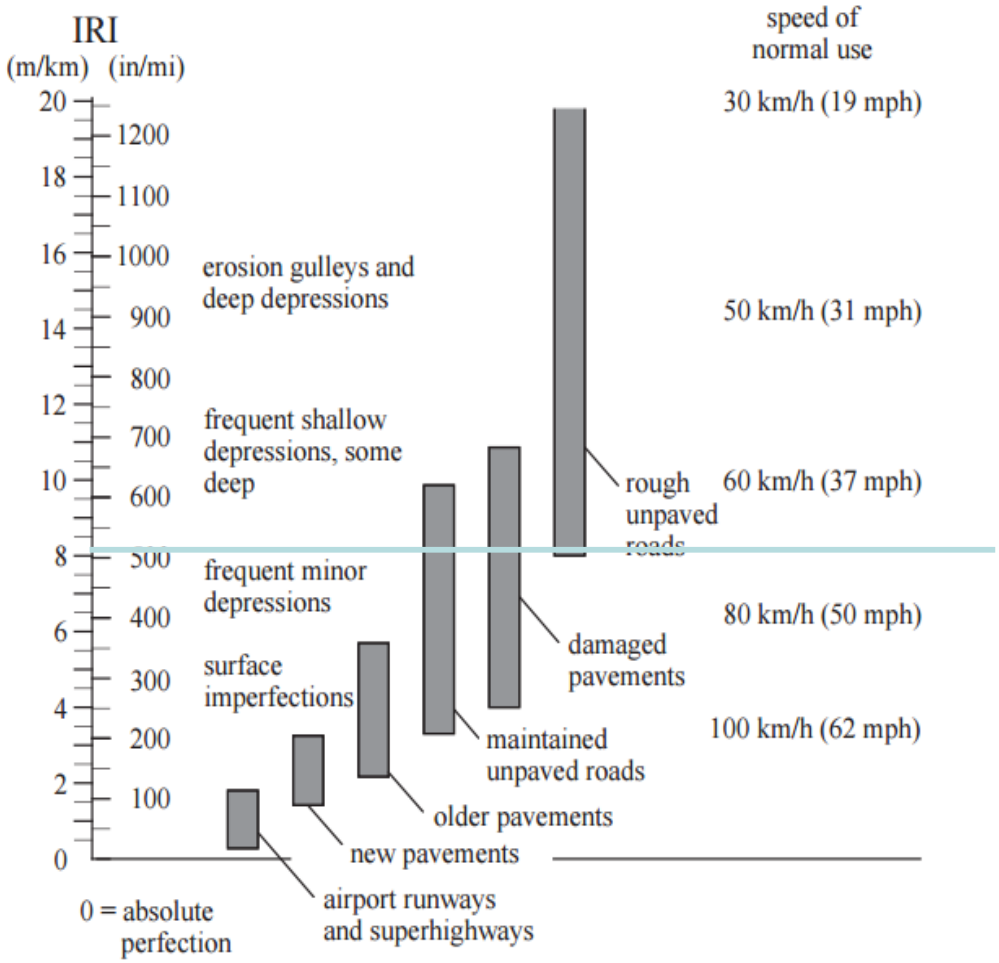
Example Roughness Device

International Roughness Index Measure

International Roughness Index (IRI) is the common roughness measure used today.

A new sealed road is normally an IRI of 2 and in my experience *most unsealed roads are graded when an IRI of 6 to 8 is achieved*.

The related safe driving speed at IRI 8 is 70km/hr at IRI 6 it is close to 90km/hr

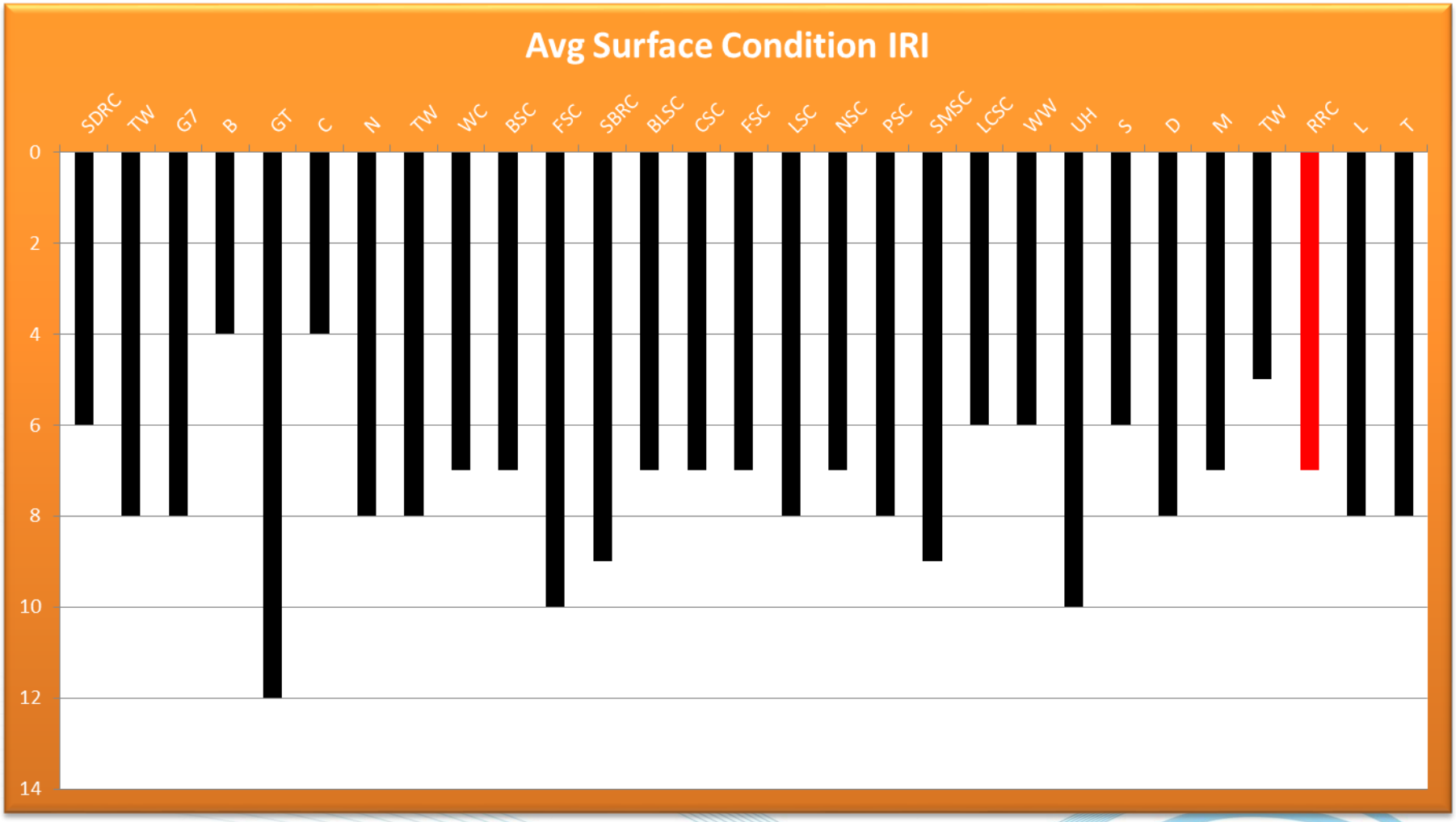


<u>There is a relationship between IRI and safe driving speed</u>

IRI At Intervention > IRI 7

IRI After Grading. IRI 3.5

IRI Intervention Comparison with Others



Red Bar is the estimated current intervention level

Data obtained from our training course 2008-2016

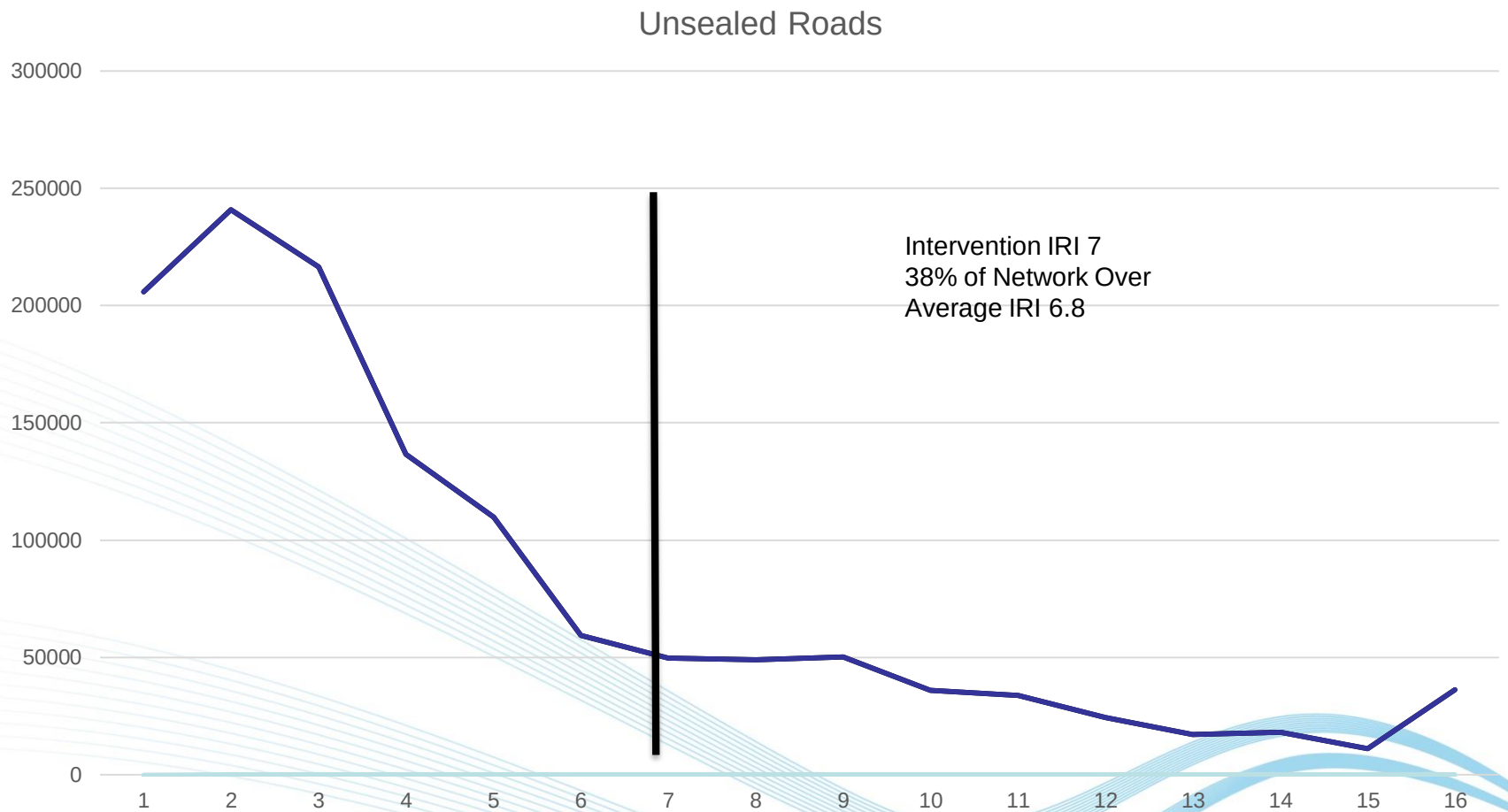
Roughness Road Intervention Report

RACAS ID	Road Name	Latest Run	Graded	Asset Number	Hierarchy	Length (m)	Avg. Speed (Km/h)	Avg. IRI	3M Date	3M IRI	IRI Intervention	Grading Required	POI Count	Subgrade (m)	% Gravel Coverage	Gravel % Intervention	Gravel Required
1960	BOYS ROAD	10/11/2017	No	6258	5A	1554	47.8	7	01/09/2018	9	7	Yes	1	0	100.00%	60%	No
1925	BULL FROG LANE	27/09/2017	No	11300	5C	6865	45.59	9	26/12/2017	9	7	Yes	1	0	100.00%	50%	No
1933	CALLIUNGAL ROAD	10/09/2017	No	10040	5A	811	19.2	6	01/07/2018	8	7	Yes	0	0	100.00%	60%	No
1958	Clem Clark Road	10/11/2017	No	55080	5A	379	20.83	5	01/09/2018	7	7	Yes	0	0	100.00%	60%	No
1942	COLES AVENUE	10/09/2017	No	10060	9B	544	20.31	6	01/07/2018	6	7	No	0	0	100.00%	20%	No
1939	CROSSLEY STREET	10/09/2017	No	10077	9A	121	14.39	5	01/07/2018	5	7	No	0	0	100.00%	50%	No
1967	DUMP ROAD	13/10/2017	No	11451	5C	1474	39.59	7	01/11/2018	7	7	Yes	2	1474	0.00%	50%	Yes
1937	ECLECTUS AVENUE	10/09/2017	No	10101	5B	181	13.44	5	01/07/2018	6	7	No	0	0	100.00%	55%	No
1954	ENRIGHT STREET	10/09/2017	No	10106	5A	217	18.85	6	01/07/2018	8	7	Yes	1	0	100.00%	60%	No
1947	FLETCHERS CREEK ROAD	10/09/2017	No	10118	5A	1000	27.8	8	01/07/2018	11	7	Yes	1	0	100.00%	60%	No
1928	GORDON LANE	10/04/2017	No	10133	5A	74	10.0	4	01/04/2018	6	7	No	1	0	100.00%	60%	No
1969	GRANTLEIGH ROAD	13/10/2017	No	11453	5B	4185	47.5	7	01/11/2018	9	7	Yes	0	1585	62.13%	55%	No
1975	JAMES ROAD	13/10/2017	No	11378	5B	364	37.1	7	01/11/2018	8	7	Yes	0	0	100.00%	55%	No
1943	KANGAROO CRESCENT	10/09/2017	No	10176	5A	252	18.8	3	01/07/2018	5	7	No	0	0	100.00%	60%	No
1941	KYONET STREET	10/09/2017	No	10184	9A	97	16.9	6	01/07/2018	6	7	No	0	0	100.00%	50%	No
1930	Lee Street	10/04/2017	No	10189	5A	478	22.2	7	01/04/2018	9	7	Yes	1	0	100.00%	60%	No
1955	MCHUGH ROAD	10/09/2017	No	10165	9B	74	1	5	01/07/2018	5	7	No	1	0	100.00%	20%	No
1927	MOUNT HOPEFUL ROAD	27/09/2017	No	106450	5A	8685	44.8	9	26/12/2017	11	7	Yes	8	0	100.00%	60%	No
1965	MUNNS ROAD	13/10/2017	No	11450	5B	6264	44.7	7	01/11/2018	8	7	Yes	3	0	100.00%	55%	No
1948	Nine Mile Road	10/09/2017	No	10233	5A	7433	33.8	10	01/07/2018	12	7	Yes	1	0	100.00%	60%	No
1968	OHL ROAD	13/10/2017	No	11452	5C	1115	43.76	8	01/11/2018	8	7	Yes	0	1115	0.00%	50%	Yes
1973	POCOCK ROAD	13/10/2017	No	11293	5A	2129	42.49	8	01/11/2018	10	7	Yes	0	70	96.71%	60%	No
1936	PORTERS LANE	10/09/2017	No	10263	5A	121	14.37	6	01/07/2018	8	7	Yes	1	0	100.00%	60%	No
1935	PORTERS ROAD	10/09/2017	No	10264	5B	188	21.58	5	01/07/2018	6	7	No	0	0	100.00%	55%	No
1938	Rockery Lane	10/09/2017	No	52360	5B	226	16.03	6	01/07/2018	7	7	Yes	0	0	100.00%	55%	No
1971	SANDY CREEK ROAD	13/10/2017	No	6203	5A	14271	41.94	9	01/11/2018	11	7	Yes	0	7291	48.91%	60%	Yes
1924	SIX MILE ROAD	27/09/2017	No	506451	5A	5881	47.22	9	26/12/2017	11	7	Yes	2	0	100.00%	60%	No
1953	TAYLOR STREET	10/09/2017	No	10328	5A	643	22.09	8	01/07/2018	11	7	Yes	1	0	100.00%	60%	No
1966	YOUNG STREET	13/10/2017	No	11523	5B	229	35.34	7	01/11/2018	9	7	Yes	0	0	100.00%	55%	No

This is the current average IRI for the Roads and is used Initially To choose the roads due for grading.

We are also predicted forward 3 month a IRI value and using this value to ensure we don't leave roads the might come up after shortly leaving the area.

Average Roughness



Surface Condition -Summary Table

Class No	Network Length km	Running Surface Condition IRI	Est Annual Traffic Movements	Average Grading Interval months (a)	Total Expenditure $	Estimate Km Graded	Avr $/km/Ann Network
150	12.3	7	54,750	9	$72,249	17.2	$4,210
125	114.7	7	45,625	9	$647,982	160.1	$4,048
100	154.8	7	36,500	12	$563,882	137.6	$4,089
75	360.6	7	27,375	24	$586,755	139.2	$4,185
30	268.5	7	10,950	36	$235,097	61.2	$3,853
10	112.6	7	3,650	36	$90,656	24.7	$3,650
Un	41.5	7		36	$23,700	7.7	
	1065			**Total**	**$2,220,322**	**547.6**	**51%**

4

1

2

3

(a) Source :ARRB Deterioration Models for Unsealed Road 2006. Over 600 sites in Aus Trial. Estimated Frequency to maintain International Roughness Index.

Process Comments

- The Budget model results in a total graded length of 550km to be grades (of a network of 1065km) for the year for a average IRI 7 obtained. This equals 52% of coverage. (Historically this matches work orders data. Year 17/18-500km, 16/17-572km)

- Current historical expenditure is around the $2M dollars. The gap in funding is **230k**.

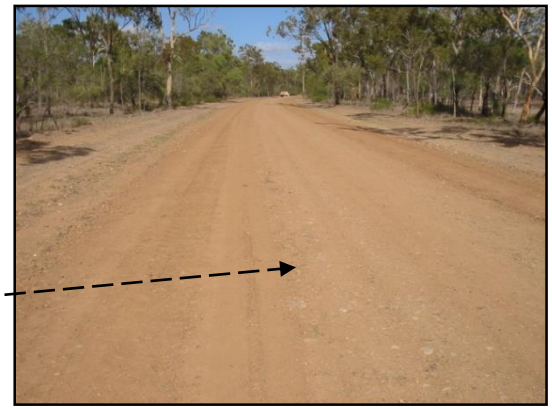
- Council needs to fund the difference otherwise the achievable IRI will drop close to a IRI of 8 for this budget.

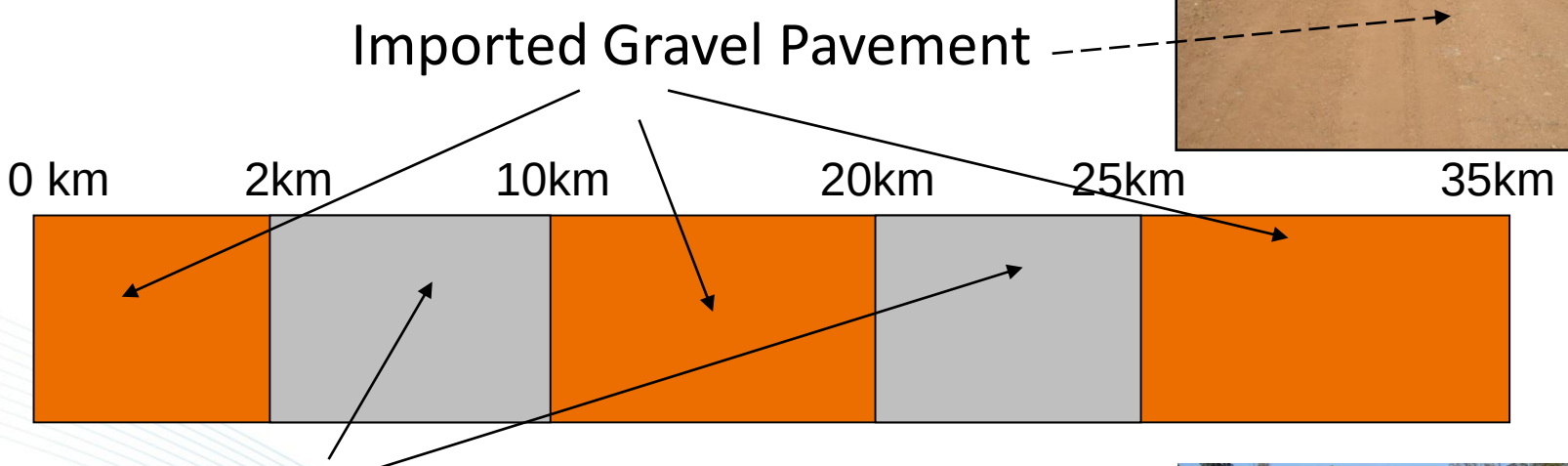
(B) Provide Wet weather access via imported gravel pavement

Measured by the % of gravel pavement provided by length of total road. Provided through gravel patching and resheetng.

How can we measure wet weather access / gravel material coverage

By determining the % of total length of gravel material verses natural material.





Determine % of Gravel Remaining

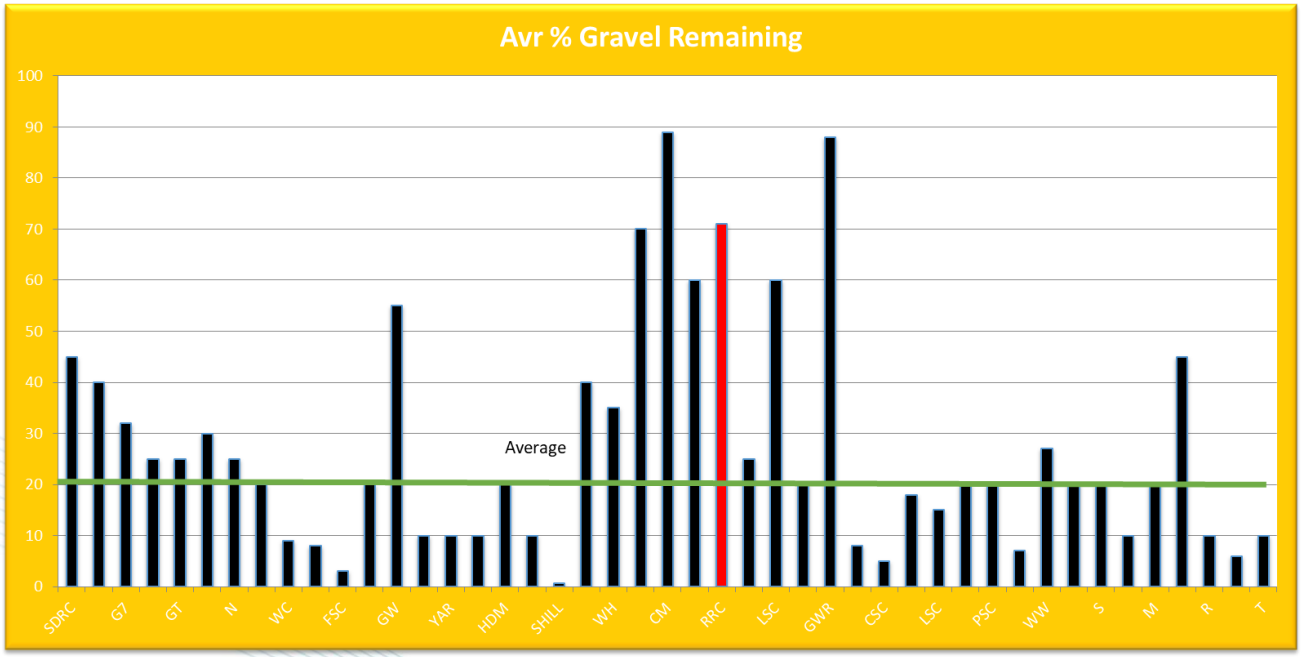
- *% of Gravel Remaining* = (Length of Road or Segment – Length of Subgrade breakout) / Length of Road or segment)

  A visual assessment of the subgrade breakout as shown below can be used to determine what percentage of pavement is remaining.

Type 2 – Slightly boggy and has little gravel

Type 1- Very Boggy with no Gravel

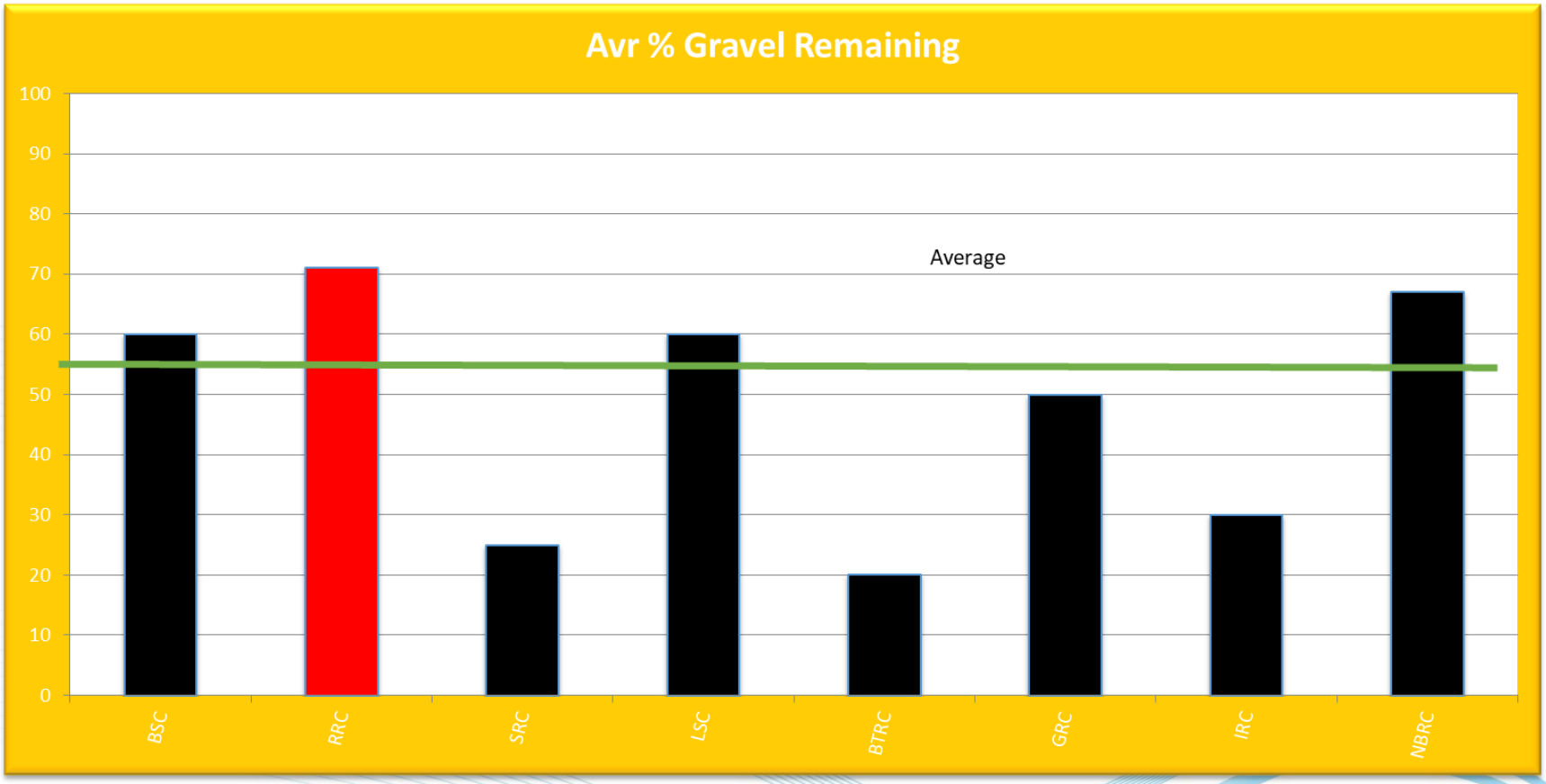
Gravel Coverage Comparisons with Others



Data obtained from our training courses since 2016

Rockhampton **Regional** Council

Regional Survey of Gravel Coverage



Gravel Coverage Report Using RACAS

RACAS	Road Name	Latest Ru	Asset Numb	Hierarc	Length (r	Avg. Speed (Km/	Subgrade (r	% Gravel Covera	Coverage INTER	GRAVEL REQ	P
1685	Bob's Creek Road	10/07/2017	6454	4A	2513	49.98	762	70%	65%	No	
1720	Riverslea Road	24/07/2017	6189	4A	10891	42.66	5274	52%	65%	Yes	
1638	Bills Road	03/07/2017	6425	4B	4417	40.93	1808	59%	60%	Yes	
1708	Dalma - Ridgelands Road	17/07/2017	6210	4B	11875	37.35	4171	65%	60%	No	
1261	Garnant Road	14/04/2017	6179	4B	4849	46.36	1235	75%	60%	No	
1719	Glenroy Road	20/07/2017	106204	4B	31377	35.25	9424	70%	60%	No	
1868	Goodwin Road	07/09/2017	11329	4B	2760	43.4	792	71%	60%	No	
1859	Kalapa - Black Mountain Road	05/09/2017	106176	4B	4975	29.14	796	84%	60%	No	
1746	Laurel Bank Road	02/08/2017	6490	4B	3836	47.94	842	78%	60%	No	
1577	Lion Mountain Road	14/06/2017	11325	4B	10719	38.5	8280	23%	60%	Yes	
1766	Mogilno Road	08/08/2017	6392	4B	4861	52.25	1155	76%	60%	No	
1606	Flaherty Road	29/06/2017	11228	5A	1007	31.68	609	40%	55%	Yes	
865	Flemington Lane	21/02/2017	10117	5A	341	12.71	30	91%	55%	No	
1721	Rookwood Road	24/07/2017	11395	5B	19087	34.59	5616	71%	55%	No	

This is the determined gravel coverage % by Length

This column is used to set defined intervention gravel coverage

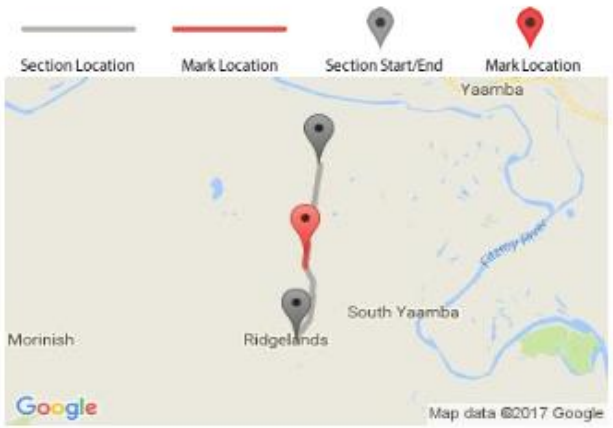
PDF Reports

RACAS road asset condition assessment system

Calmorin Road - 17-08-23 - 1857

Subgrade

ROAD NAME	CALMORIN ROAD - 17-08-23 - 1857
RACAS ID	1857
ROAD LENGTH	8643.00 (m)
ROAD AREA	51858.00 (m²)
AVG. SPEED	56.92 (km/h)
MARKED AS	Subgrade
CHAINAGE START	3878.00 (m)
CHAINAGE END	4960.00 (m)
LENGTH MARKED	1082.00 (m)
AVG. WIDTH MARKED	4.50 (m)
AREA MARKED	4869.00 (m²)
TAGS MARKED	9,Middle
AVG. IRI MARKED	4.2749



RACAS road asset condition assessment system

(150.29081,-23.20741) 2017-Aug-23 11:45:09 978

(150.29039,-23.21003) 2017-Aug-23 11:45:27 219

(150.29000,-23.21252) 2017-Aug-23 11:45:42 990

Road Survey Results

The whole network has been defect logged
and the results have been summarised into
the roads classes.

Individual road data is used for determination
of individual road programs.

Survey Results	
% Coverage	Road Class
68%	4A
74%	4B
76%	5A
68%	5B
74%	5C
43%	5D
84%	9A
81%	9B

Pavement Cost to Maintain to Current Standard

At the Surveyed standard (Dec 2017)

Class No	Network Length km	Est Annual Traffic Movements	% of Gravel Pavement by Length-Years	Total Expenditure $	M3/yr	Avr $/km
3	14	54,750	70%-9yrs	$38,948	1163	$3,167
4a	140	36,500	70%-9yrs	$363,231	10843	$3,167
4b	290	29,200	74%-9yrs	$431,795	12889	$2,789
5a	972	20,075	76%-11yrs	$1,032,729	30828	$2,864
5b	471	9,125	68%-11yrs	$550,525	16434	$2,050
5c	123	1,825	74%-21yrs	$251,215	7499	$2,231
5d	21		80%-10 yrs	$180,362	5384	$4,346
	2031			**2,848,806**	**85,039**	

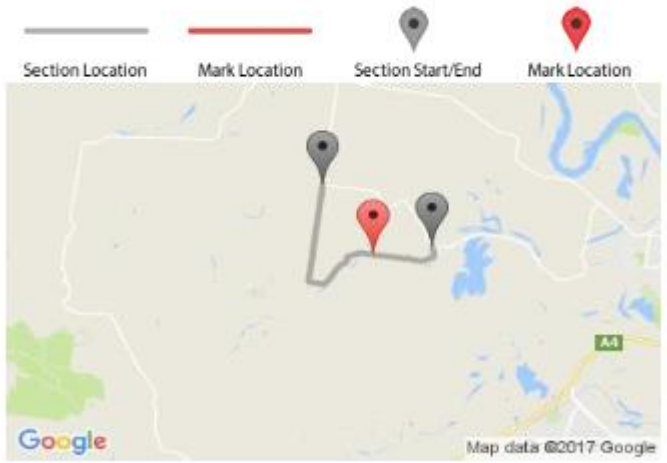
High Priority Defects

- Small wash outs or isolated potholes on a otherwise good road
- Send a small bobcat to undertake repair
- Brings road above the service level

High Priority Defects Report

HPD

ROAD NAME	LION MOUNTAIN ROAD - 17-06-14 - 1577
RACAS ID	1577
ROAD LENGTH	10719.00 (m)
ROAD AREA	64314.00 (m²)
AVG. SPEED	38.47 (km/h)
MARKED AS	HPD
CHAINAGE	3095.00 (m)
POI DATA	HPD
IRI MARKED	20.8647



Data obtained from our training courses since 2016

Summary

- Consultation with your Councilors and Community is a must
- To maintain the rural roads at the current standard Council uses the RACS System
- Set service levels that can be easily measured and reported back to the community
- Roads are inspected a minimum twice yearly with high order roads surveyed more

Rockhampton Regional Council

End