



BELTRAMI
county

What Next?

- Utilize the pavement data
- PathWeb
- Pavement Management software programs
 - ICON
 - GRIT
 - StreetSaver
 - Cartegraph
- Spreadsheet

Understand the data

	D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM		
1	RN	Dir	BegCM	EndCM	BegRP	EndRP	Length	BeginTerm	Remarks	Year	Lns	Pav	IRIL	IRIR	MNRI	RQI	SR	PQI	PAT	SLT	MET	SET	SLL	MEL	SEL	SIJ	MEJ	SEJ	MUL	ALL	RUT	RVL	RutL	RutR	SLS		
2	1	D	0.000	1.000	1.000	0.000	1.000			2022	2	BIT	125	162	3.2	2.7																		0.07	0.11		
3	1	I	0.000	1.000	0.000	1.000	1.000	MARSHALL CO CS-54 BHD		2022	2	BIT	118	147	3.3	2.8	3.5	3.1			43		1							15				0.07	0.12		
4	1	D	1.000	2.000	2.000	1.000	1.000			2022	2	BIT	126	169	3.2	2.7																		0.05	0.11		
5	1	I	1.000	2.000	1.000	2.000	1.000			2022	2	BIT	121	134	3.3	2.8	3.6	3.2			51		1							10				0.05	0.11		
6	1	D	2.000	3.000	3.000	2.000	1.000			2022	2	BIT	122	171	3.3	2.8																		0.06	0.15		
7	1	I	2.000	3.000	2.000	3.000	1.000			2022	2	BIT	125	157	3.2	2.7	3.1	2.9			48		3							33				0.04	0.11		
8	1	D	3.000	4.000	4.000	3.000	1.000			2022	2	BIT	121	136	3.3	2.8																		0.05	0.11		
9	1	I	3.000	4.000	3.000	4.000	1.000			2022	2	BIT	118	143	3.3	2.8	3.5	3.1			48									14				0.03	0.10		
10	1	D	4.000	5.000	5.000	4.000	1.000			2022	2	BIT	143	173	3.0	2.5																		0.08	0.12		
11	1	I	4.000	5.000	4.000	5.000	1.000			2022	2	BIT	130	169	3.1	2.7	2.9	2.8			60	1	1							43				0.04	0.11		
12	1	D	5.000	5.750	5.750	5.000	0.750	ROSEAU CO CSAH-9 AHD		2022	2	BIT	148	184	2.9	2.5																			0.08	0.13	
13	1	I	5.000	5.750	5.000	5.750	0.750			2022	2	BIT	118	147	3.3	2.8	3.0	2.9			69	2	1							37				0.03	0.08		
14	2	D	0.000	0.910	0.910	0.000	0.910	TH-71 X-ING		2022	2	BIT	54	61	4.2	3.8																		0.05	0.07		
15	2	I	0.000	0.910	0.000	0.910	0.910	HUBBARD CO CS-35 BHD		2022	2	BIT	50	47	4.3	3.8	3.9	3.8			3		11							1				0.02	0.06		
16	2	D	0.910	2.000	2.000	0.910	1.090			2022	2	BIT	55	67	4.2	3.7																		0.04	0.05		

Manuals and Overviews

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Subject areas

Annual publications

- [2020 Pavement Condition Annual Report](#)

Data quality management plan

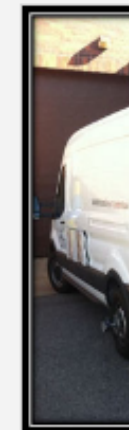
- [Approved Data Quality Management Plan](#)
- Equipment calibration procedures
 - [Block & Bounce Tests](#)
 - [Water Tray Test](#)

Manuals & overviews

- [Distress Identification Manual](#)
- [Video-Log User Manual](#)
- [Pavement Condition Rating Overview](#)

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My PM Spreadsheet

	A	B	D	E	I	J	U	V	W	AC	
1	route	Seg#	Termini	Length	ExisTraf fic 2018	last yr surface	PQI 2018	PQI 2020	PQI 2022	rut dept	
2	305	5	CSAH 57 to CSAH 21	0.44		2022			4	0.03	r
3	305	10	CSAH 21 to Turtle River	2.6	445	2000	3.1	3	2.8	0.07	c
4	305	20	Turtle River to CSAH 22	1.1	190	2010	3.2	3.2	3.1	0.06	t
5	401	10	Hubbard to CSAH 46	1	610	2003	3.3	3.2	3.2	0.14	r
6	401	20	CSAH 46 to CSAH 11	0.83	820	2003	2.3	1.9	1.9	0.14	t
7	402	10	Bible College to CSAH 46	0.29	295	2016	3.2	3.2	3.3	0.04	r
8	402	20	TH 71 to east	0.18	195	2011	3.3	3.2	3	0.05	g
9	403		CSAH 4 to CR 404	1.5	100	2006	3.6	3.6	3.4	0.1	g
10	404	10	CSAH 50 to Tyler	1	1050	2020	2.3	3.1	3.8	0.05	r
11	404	20	23rd st to 30th St	0.5	660	2000	3.6	3.5	3.6	0.06	g
12	404	30	Tyler Ave to CR 403	1	660	2005	3.6	3.5	3.6	0.06	g
13	406		CSAH 12 to 1 mile east	1	800	2020	2.8	2.6	3.6	0.08	r
14	407	10	CSAH 4 TO CR 404	1.5	245	2006	3.6	3.3	3.1	0.16	l
15	407	20	CR 404 to CSAH 8	1.5	245	2006	2.1	1.7	1.8	0.21	k

My PM Spreadsheet

	A	AD	AG
1	route	status	2023 review
2	305	new	good
3	305	cracks starting to dip	good for now, level cracks, seal
4	305	trans cracks, movement near bridge	good for now
5	401	minimal trans cracks, some starting to dip	good for now, level cracks, seal
6	401	trans cracks starting to dip	resurface
7	402	new	good
8	402	good	good
9	403	good, a few cracks starting to dip	good
10	404	new	good
11	404	good, a few transverse cracks	good
12	404	good, a few transverse cracks	good
13	406	new	good
14	407	lots of trans cracks, long. Crack, some rutting	MUL 16<20, RQI avg=2.9>2.7, crack count 75>60, will =
15	407	block and alli cracking, cracks deteriorated, narrow	resurface
16	407	lots of trans cracks	good

My PM Spreadsheet

	A	AH	AI	AJ	AK
1	route	Proposed construction	Proposed maintenance	Proposed Yr	Est Yr for seal coat
2	305	seal coat	crack seal		2025
3	305	seal coat	patch		2026
4	305	seal coat	crack seal		2026
5	401	seal coat	patch		2026
6	401	resurface	patch and hold together	2024	2025
7	402	seal coat	crack seal		2024
8	402	seal coat	crack seal		2024
9	403	seal coat	patch		2024
10	404	seal coat	crack seal		2028
11	404	seal coat	crack seal		2028
12	404	seal coat	crack seal		2028
13	406	seal coat	crack seal		2028
14	407	Mill and fill - medium	patch	2024	2025
15	407	resurface	patch and hold together	2024	2025
16	407	seal coat	crack seal		2024

Using the data

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Decision Trees

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Data quality management plan

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- Equipment calibration procedures
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 - [Water Tray Test](#)

Manuals & overviews

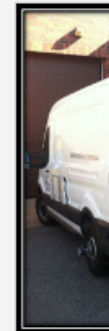
- [Distress Identification Manual](#)
- [Video-Log User Manual](#)
- [Pavement Condition Rating Overview](#)

Miscellaneous

- [County State Aid Pavement Testing Schedule](#)
- Network level decision trees
 - [Bituminous Decision Tree](#)
 - [Concrete Decision Tree](#)

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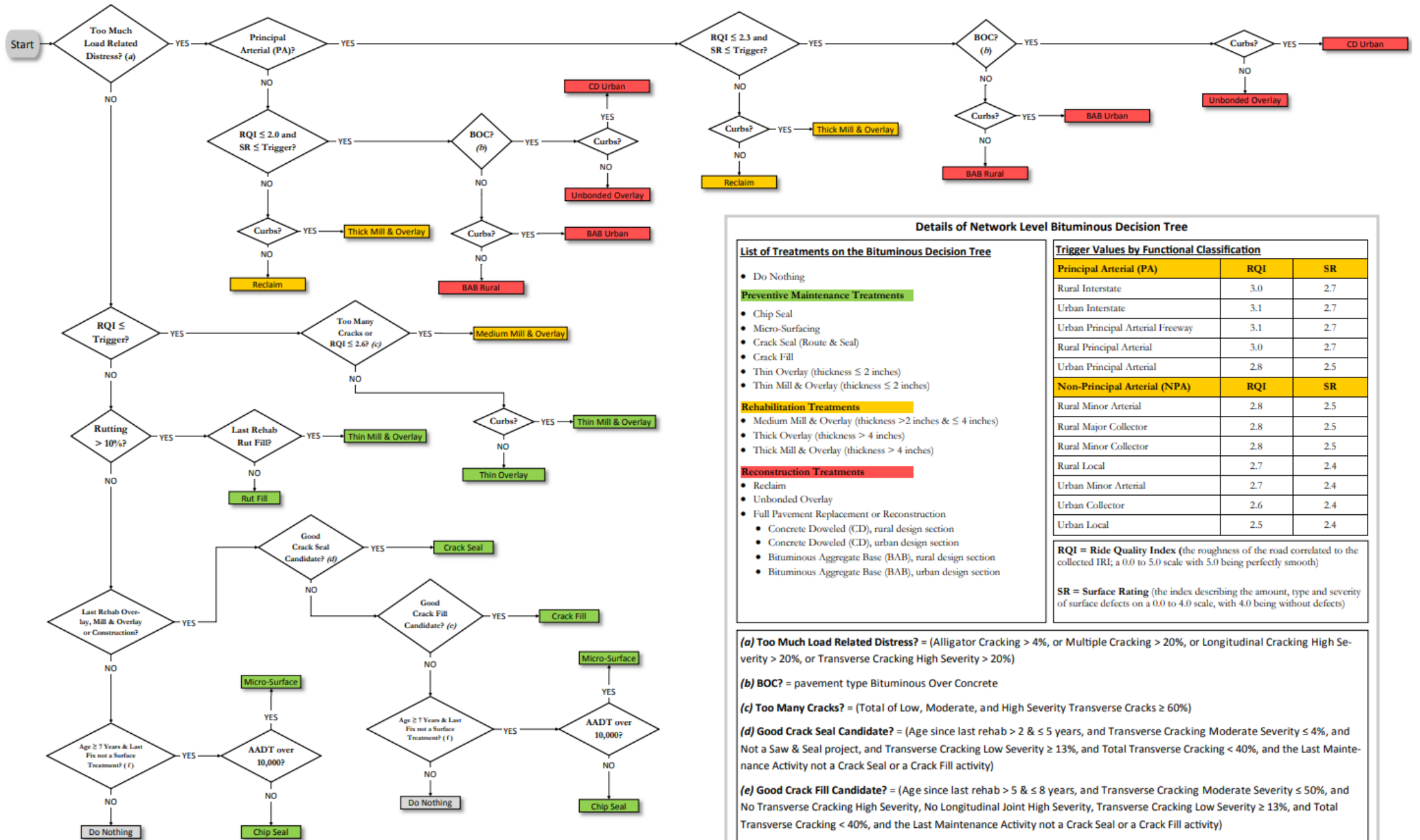
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Network Level Bituminous Decision Tree



Details of Network Level Bituminous Decision Tree

List of Treatments on the Bituminous Decision Tree

- Do Nothing
- Preventive Maintenance Treatments**
 - Chip Seal
 - Micro-Surfacing
 - Crack Seal (Route & Seal)
 - Crack Fill
 - Thin Overlay (thickness ≤ 2 inches)
 - Thin Mill & Overlay (thickness ≤ 2 inches)
- Rehabilitation Treatments**
 - Medium Mill & Overlay (thickness > 2 inches & ≤ 4 inches)
 - Thick Overlay (thickness > 4 inches)
 - Thick Mill & Overlay (thickness > 4 inches)
- Reconstruction Treatments**
 - Reclaim
 - Unbonded Overlay
 - Full Pavement Replacement or Reconstruction
 - Concrete Doweled (CD), rural design section
 - Concrete Doweled (CD), urban design section
 - Bituminous Aggregate Base (BAB), rural design section
 - Bituminous Aggregate Base (BAB), urban design section

Trigger Values by Functional Classification

Principal Arterial (PA)	RQI	SR
Rural Interstate	3.0	2.7
Urban Interstate	3.1	2.7
Urban Principal Arterial Freeway	3.1	2.7
Rural Principal Arterial	3.0	2.7
Urban Principal Arterial	2.8	2.5
Non-Principal Arterial (NPA)	RQI	SR
Rural Minor Arterial	2.8	2.5
Rural Major Collector	2.8	2.5
Rural Minor Collector	2.8	2.5
Rural Local	2.7	2.4
Urban Minor Arterial	2.7	2.4
Urban Collector	2.6	2.4
Urban Local	2.5	2.4

RQI = Ride Quality Index (the roughness of the road correlated to the collected IRI; a 0.0 to 5.0 scale with 5.0 being perfectly smooth)

SR = Surface Rating (the index describing the amount, type and severity of surface defects on a 0.0 to 4.0 scale, with 4.0 being without defects)

(a) Too Much Load Related Distress? = (Alligator Cracking > 4%, or Multiple Cracking > 20%, or Longitudinal Cracking High Severity > 20%, or Transverse Cracking High Severity > 20%)

(b) BOC? = pavement type Bituminous Over Concrete

(c) Too Many Cracks? = (Total of Low, Moderate, and High Severity Transverse Cracks ≥ 60%)

(d) Good Crack Seal Candidate? = (Age since last rehab > 2 & ≤ 5 years, and Transverse Cracking Moderate Severity ≤ 4%, and Not a Saw & Seal project, and Transverse Cracking Low Severity ≥ 13%, and Total Transverse Cracking < 40%, and the Last Maintenance Activity not a Crack Seal or a Crack Fill activity)

(e) Good Crack Fill Candidate? = (Age since last rehab > 5 & ≤ 8 years, and Transverse Cracking Moderate Severity ≤ 50%, and No Transverse Cracking High Severity, No Longitudinal Joint High Severity, Transverse Cracking Low Severity ≥ 13%, and Total Transverse Cracking < 40%, and the Last Maintenance Activity not a Crack Seal or a Crack Fill activity)

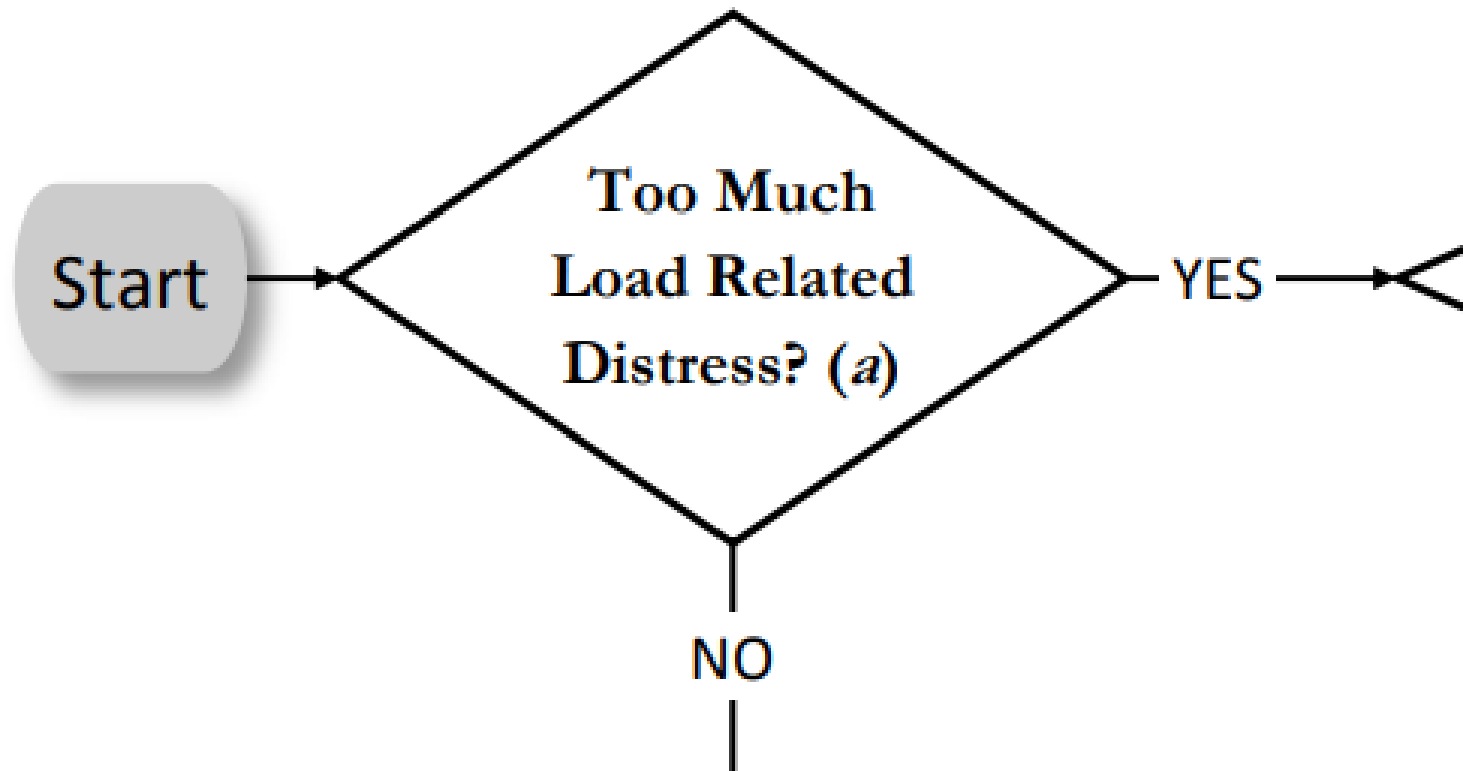
(f) Last Fix Not a Surface Treatment? = Last fix in pavement history not a chip seal or a micro-surfacing activity

Using the data

MUL 16<20, RQI avg=2.9>2.7, crack count 75>60,

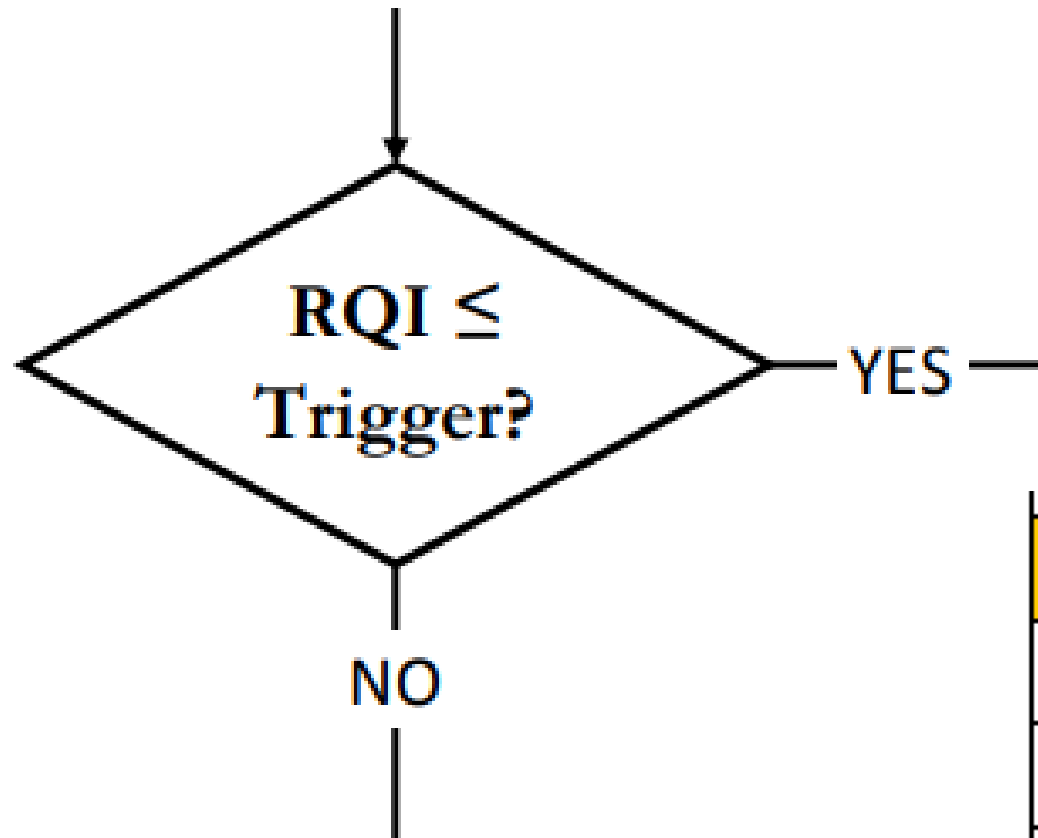
	D	T	U	V	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	RN	RQI	SR	PQI	SLT	MET	SET	SLL	MEL	SEL	SLJ	MEJ	SEJ	MUL	ALL
868	407	2.9													
869	407	3.0	3.2	3.1	72	3		4				6		16	

MUL $16 < 20$, RQI avg = $2.9 > 2.7$, crack count $75 > 60$,



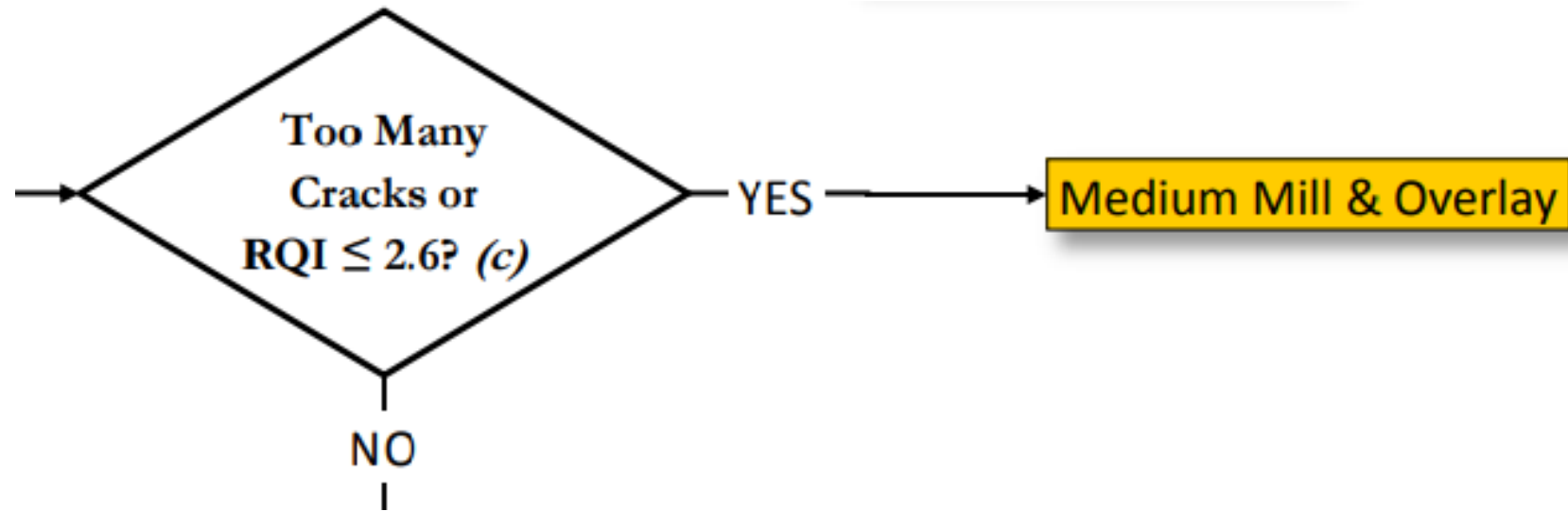
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MUL 16<20, RQI avg=2.9>2.7, crack count 75>60,



Non-Principal Arterial (NPA)	RQI
Rural Minor Arterial	2.8
Rural Major Collector	2.8
Rural Minor Collector	2.8
Rural Local	2.7

MUL $16 < 20$, RQI avg = $2.9 > 2.7$, crack count $75 > 60$,



(c) Too Many Cracks? = (Total of Low, Moderate, and High Severity Transverse Cracks ≥ 60%)

. will = medium M&O when RQI \leq 2.7, 2011=3.7, 2015=3.5 2018=3.3, 2020=3.0

Questions??