CECSD Road Stewardship

"Windshield Survey"

Lynn Kissel

December 14, 2022

For annual road survey this year, create a baseline, comprehensive pavement assessment

- Produce a comprehensive pavement assessment report of our roadways
  - Road Committee member(s) with consultant does "windshield survey" of all our roads (*à la* TMS Handbook); addresses uniformity of our annual survey; thinking 1- or 2-day active survey; have a draft assessment form available for review
  - Characterize each roadway segment: composition HMA/chip; thickness/traffic/subgrade (Pavement Prediction Curves, LACo)
  - Identify existing distresses (type & size), severity (L/M/H) on each segment (TMS Ch 3)
  - Road Committee writes the final report; what is the consultant's deliverable?
  - Trained Road Committee capable of future assessment updates
- Propose treatments (individual projects) for each road segment that address distresses identified in the assessment
  - Part 2, after the windshield survey; unordered list of projects (like pile of Legos™)
- Role of all directors now is to
  - Individually critique the assessment, especially for their assigned roads
  - Collectively select and schedule treatments list of projects (build multiyear plan, like stacking Legos™)
  - Select future maintenance schedule(s) for each segment after distresses fixed (eg, fog @ 3-5 yr intervals, or chip @ 7-10 yr intervals – *incl. cost of restriping? Fog+25%, Chip+6%*)

Rx for CECSD? Patch, chip, fog or slurry; maintain w/recurring {?} seals? $/yr?
Is a future of fixing isolated distresses and repeated {?} seals a reasonable goal?

DRAFT Survey Form

Date:

Segment ID: OldMill

Inspector:

Comment:

Length: 935 ft

Width: 13 ft

Area: 12,155 ft^2

Thickness: 1 (1= thin, 2= medium, 3= thick)

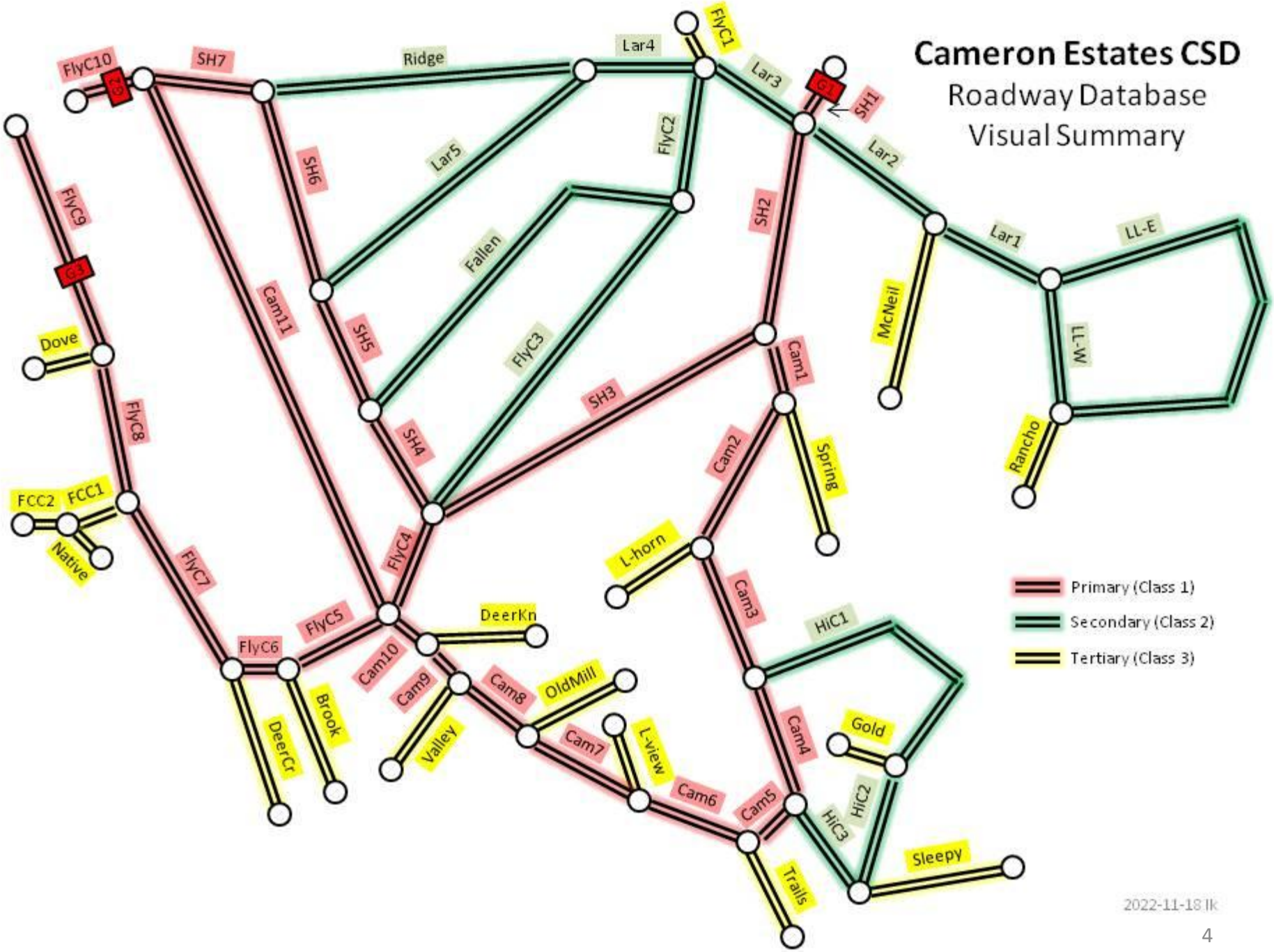
Traffic: 1 (1= low, 2= medium, 3= high)

Subgrade: 1 (1= weak, 2= strong)

Distress Type	Unit	Severity (L/M/H)	Estimate Distress Size (use easiest one, not both)		
			% of L or A	# of Units	Comment
Bleeding	SF				
Bumps & Sags	LF				
Cracking: Alligator	SF				
Cracking: Block	SF				
Cracking: Edge	LF				
Cracking: Joint Reflection	LF				
Cracking: Longitudinal	LF				
Cracking: Transverse/Thermal	LF				

DRAFT Survey Form

Distress Type	Unit	Severity (L/M/H)	Estimate Distress Size (use easiest one, not both)		
			% of L or A	# of Units	Comment
Oxidation	SF	NONE			
Patching	SF				
Pocking	NONE	NONE			
Polished Aggregate	SF	NONE			
Potholes	#	LOW			
	#	MED			
	#	HIGH			
Rutting	SF				
Shiving & Corrugation	SF				
Spalling	NONE	NONE			
Weathering/Raveling	SF				


Cameron Estates CSD
Roadway Database
Visual Summary
FlyC10
G2
SH7
Ridge
Lar4
FlyC1
Lar3
G1
SH1
FlyC9
G3
SH6
Lar5
FlyC2
Lar2
SH2
Fallen
Lar1
LL-E
McNeil
LL-W
Dove
Cam11
SH5
FlyC3
Cam1
SH3
Rancho
FlyC8
SH4
Cam2
Spring
FCC2
FCC1
Native
FlyC4
L-horn
Cam3
HiC1
FlyC7
FlyC5
DeerKn
FlyC6
Cam10
Cam9
Cam8
OldMill
Gold
Brook
DeerCr
Valley
Cam7
L-view
Cam4
Cam6
Cam5
HiC2
HiC3
Sleepy
Trails
Primary (Class 1)
Secondary (Class 2)
Tertiary (Class 3)
2022-11-18 lk

CECSD Roadway Database

Roadway	Class	Length (ft)	Width (ft)	Area (SF)
Brookside Rd	3	1,124	18	20,232
Cameron Rd (A)	1	9,969	20	199,380
Cameron Rd (B)	1	6,672	22	146,784
Deer Creek Rd	3	1,466	18	26,388
Deer Knoll Rd	3	661	16	10,576
Dove Meadow Ct	3	649	16	10,384
Fallen Leaf Rd	2	3,800	18	68,400
Flying C Ct	3	997	16	15,952
Flying C Cul de Sac	3	841	16	13,456
Flying C Rd (A)	2/1	5,948	20	118,960
Flying C Rd (B)	1	7,398	22	162,756
Gold Spur Rd	3	326	16	5,216
Highcrest Dr	2	5,328	18	95,904
Lariat Dr	2	8,099	20	161,980
Lariat Lp	2	6,728	18	121,104
Longhorn Ridge Rd	3	576	10	5,760
Longview Rd	3	715	18	12,870
McNeil Rd	3	2,790	18	50,220
Native Ln	3	1,157	16	18,512
Old Mill Rd	3	935	13	12,155
Rancho Rd	3	601	16	9,616
Ridge Pass Dr	2	3,138	18	56,484
Sleepy Hollow Rd	3	2,120	18	38,160
Spring Meadow Rd	3	1,307	18	23,526
Strolling Hills Rd	1	11,760	22	258,720
Trails End Rd	3	808	16	12,928
Valley Vista Rd	3	1,265	16	20,240
	Totals	87,178	feet	1,696,663
		16.5	miles	

Class	Length		Area
	(ft)	(mi)	(SF)
1	36,598	6.93	783,620
2	32,242	6.11	606,852
3	18,338	3.47	306,191
Totals	87,178	16.51	1,696,663

Information adopted by the CECSD Board on 2022-11-19

Our understanding of responsible road stewardship has evolved as we've digested these resources

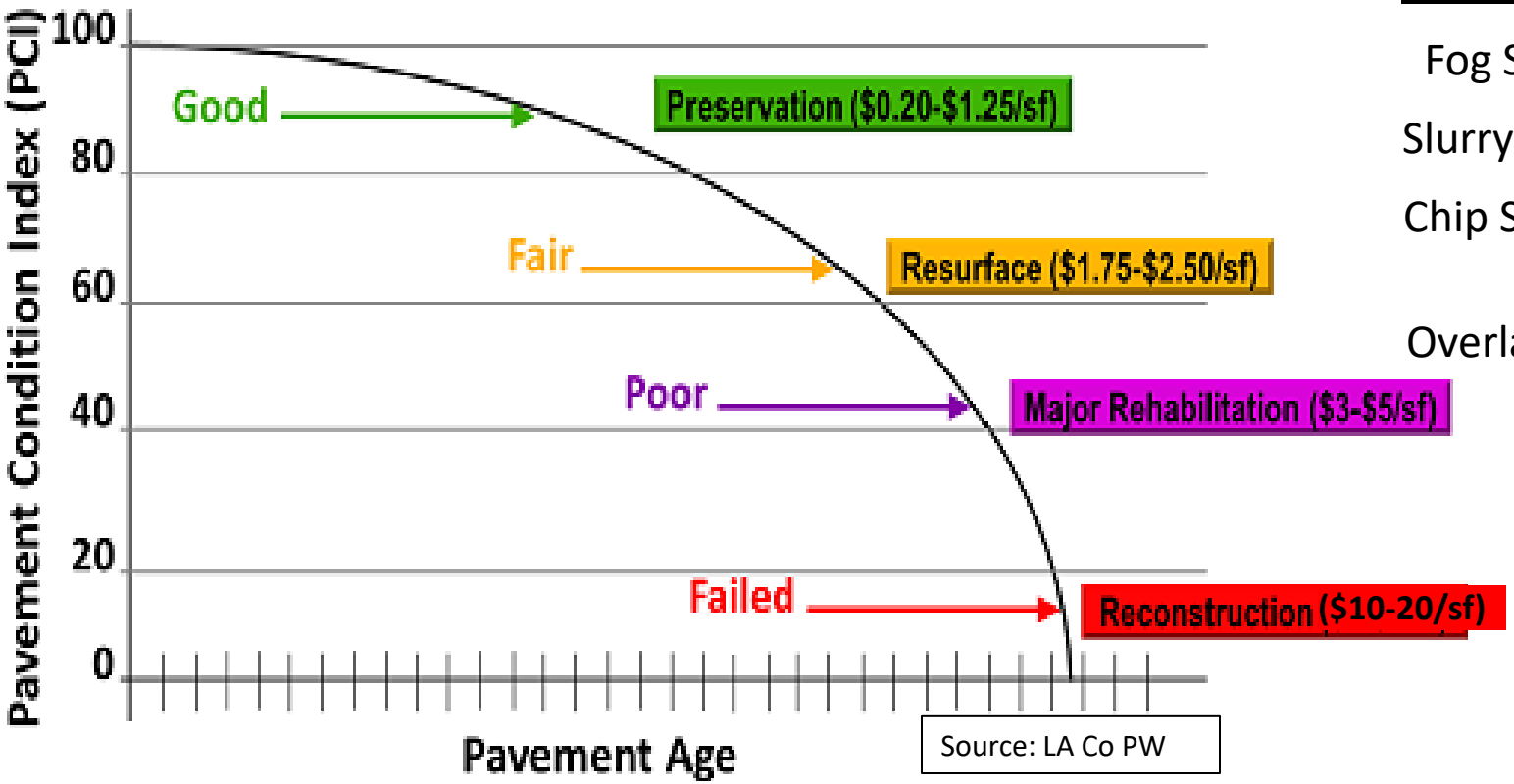
- World Bank, *Transportation Note No. TRN-4* (2005)
  - "Why road maintenance is important and how to get it done"
  - Importance of MAINTENANCE (what is that?), INFLATION (PPI vs CPI)
- LA County Public Works, "Road Stewardship" (web)
  - "Right Road, Right Treatment, Right Time, Right Way;" How to methodology; developed with industry; 7400 lane-miles of road (adapt to our ~30 lane miles)
  - Important cost savings of PAVEMENT PRESERVATION, what MAINTENANCE really means, 10x in costs based on approach
  - Gave future cost estimates for Spring Meadow (C-3 surrogate*); extend to all roads
- Iowa State University (Iowa DOT), *Thin Maintenance Surfaces Handbook* (2007)
  - Easy read; pros/cons; when/which TMS to use; maintenance vs stop gap
  - "Windshield survey," simple materials and procedure – perfect for us?
  - For me, answered question "Are the cracks in our slurry seal to be expected/OK?"

CECSD needs solutions that are effective within both our money and people resources

• C-3 $/SF/yr in 2022: fog/slurry/chip ~0.04-0.20; HMA overlay ~0.30-1.00; R&R ~0.50-1.50

“Road Stewardship” is designed to improve roads, reduce costs, forecast future costs

Pavement Performance Curve



Typical Treatments

Fog Seal (3-5yrs)

Slurry Seal (5-7yrs)

Chip Seal (7-10yrs)

Overlay (14-18yrs)

R&R

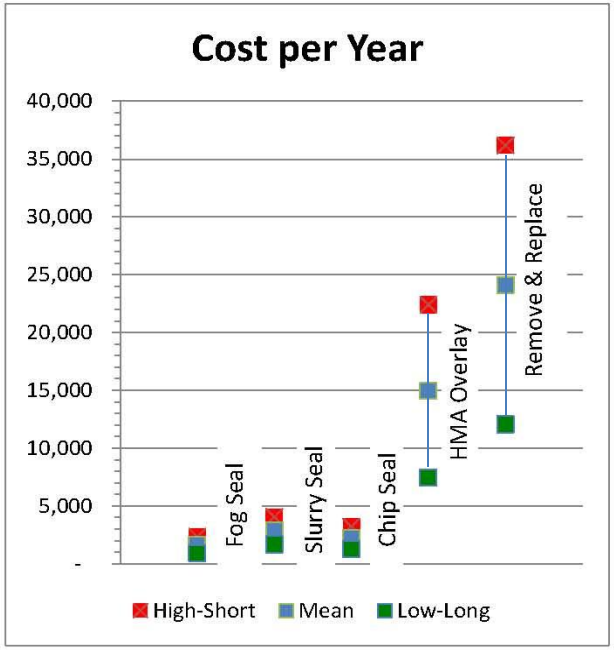
Delayed treatment buys diminishing years of service at accelerating cost of repair

Comparing Strategies

Date: 9/8/2022
Segment(s): Spring Meadow Rd (Spring)

Length (ft): 1,307.0
Width (ft): 18.0
Area (sf): 23,526.0

Thickness: 1 (1=> thin, 2=> medium, 3=> thick)
Traffic: 1 (1=> low, 2=> medium, 3=> high)
Subgrade: 1 (1=> weak, 2=> strong)
Perf Pred Curve #: 4 (thin/low/weak -> Curve 4)



Intervals from Pavement Prediction Curves (LACo)

Curve 4 (thin/low/weak)	Years	Delta
PCI 100 -> 80	4.00	
PCI 100 -> 60	7.50	3.50
PCI 100 -> 40	10.50	3.00
PCI 100 -> 20	13.00	2.50

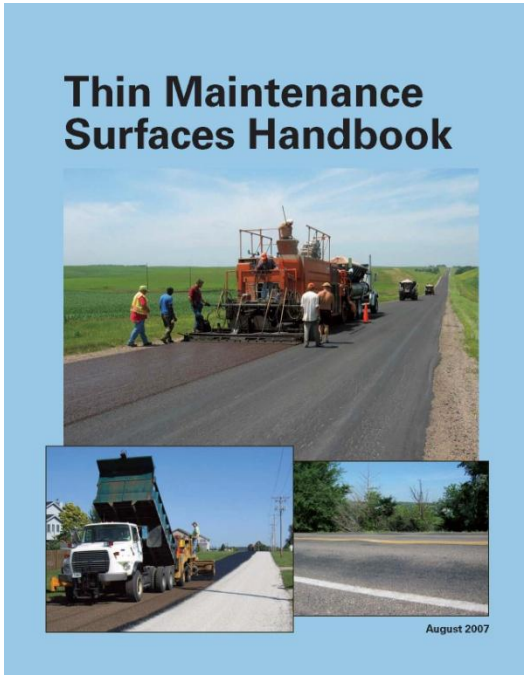
	Cost per Treatment		Repeated (Yrs)		Cost per Year				
Treatment	Low	High	Short	Long	Low/Long	High/Short	Mean	Rel. Diff.	Comment
Fog Seal (fine)	4,705	7,058	3.0	5.0	941	2,353	1,647	0%	Cost effective; in budget?
Slurry Seal (med)	11,763	20,326	5.0	7.0	1,680	4,065	2,873	74%	Cost effective; in budget?
Chip Seal (course)	13,070	22,585	7.0	10.0	1,307	3,226	2,267	38%	Cost effective; in budget?
HMA Overlay	117,630	235,260	10.5	15.8	7,469	22,406	14,937	807%	Nicest roads; breaks budget!?
Remove & Replace	235,260	470,520	13.0	19.5	12,065	36,194	24,129	1365%	Nicest roads; breaks budget!?

Date	PCI	Comment
9/8/2022	96.00	LK: Patches & chip seal in 2022; no cracks (+100), surface rough (-4); FOG seal in 3-5 yrs (2025-27)

"Pavement Preservation" techniques have the lowest costs for sustained road ownership

Some highlights from the TMS Handbook

- Chapter 4, Treatments at a glance
  - One page summary! A handy reference! Review the tables
- Chapter 6, Treatment options
  - Seal coat (aka “chip seal”), p23
    - advantages “seals cracks; inexpensive; flexible; moves with pavement without cracking”
    - disadvantages “unbound aggregate, flyrock; initially rough/noisy; dust can be generated”
  - Slurry seal, p27
    - disadvantages “Because of its brittle nature, the slurry seal will reflect all cracks quickly”
    - (Guessing that prior crack seal would not have prevented cracks; seal is flexible, pavement will still move; tile floors)
- What is our traffic volume?
  - Important parameter for selecting appropriate treatments
  - Measured in AADT (Annual Average Daily Traffic),
    AADT <2000 is considered “light” traffic
  - An upper-bound estimate? Expect highest traffic at gates
    - 300 parcels * 5 trips/day/parcel * 2 round trip ÷ 2 ways out
      = 1500 AADT $\Rightarrow$ *ALL* our traffic is “light”



Incorporate elements of these strategies to improve our roads and manage our costs

Ch 4. Treatments at a glance

The following tables summarize the information presented about treatment selection in Chapter (7). These tables recommend which surfaces are suitable for the various distresses and traffic volumes. However, these tables do not break down the various distresses by level of severity. For a more detailed breakdown, refer to the tables for individual surfaces located in Chapter (X). These tables can be taken along on a windshield survey to help start the selection process.

		Micro-surfacing*	Slurry seal**	Thin HMA overlay	NovaChip®
Rut depth					
Rut depth	Less than ¼ inch	One course	One course	One course	One course
	¼ to ½ inch	Scratch course and final surface#	One course	One course	One course
	½ to 1 inch	Rut box and final surface@	Micro-surfacing scratch course and final surface	Scratch course plus surface course	Mill surface or use another material for scratch course
	Greater than 1 inch	Multiple placements with rut box	***	Scratch course plus surface course	Mill surface or use another material for scratch course

* As recommended by International Slurry Seal Association
** Current practice in Iowa
*** Sometimes successful (anecdotal evidence)
# Anecdotal evidences suggests that one course may be sufficient for functionallity, but apperance may be compromised
@ Scratch course and surface course have been successfully used in Iowa according to author observations.

		Fog seal	Seal coat	Slurry seal	Micro-surfacing	Thin HMA overlay
Traffic volume:						
	AADT<2,000	✓	✓	✓	✓	✓
	2,000>AADT>5,000	✓	↔(1)	↔(1)	✓	✓
	AADT>5,000	✓	↔(4)	↔(1)	✓	✓
Bleeding		⊗	✓	✓	✓	✓
Rutting		⊗	⊗	✓	✓	✓
Raveling		✓	✓	✓	✓	✓
Cracking						
	Few tight cracks	✓	✓	✓	✓	✓
	Extensive cracks	⊗	✓	⊗	⊗	✓
	Alligator cracking	⊗	↔	⊗	⊗	⊗
Low friction		May improve(3)	May improve	May improve	May improve(2)	May improve
Snowplow damage		Least susceptible	Most susceptible	Moderately susceptible	Least susceptible	Least susceptible

✓ Recommended ⊗ Not recommended ↔ Marginal

[1] There is a greater likelihood of sucess when used in lower speed traffic.
[2] Micro-surfacing reportedly retains high friction for a longer period of time.
[3] Fog seal will reduce friction for the first few months until traffic wears binder of the tops of aggregate
[4] Not used in Iowa, but other states have seen success.

Chip Seal ≡ Seal Coat

All CECSD AADT <2000

Other requirements for TMS, eg "good base"

Rutting is not a major problem ⇒most base OK for our "light" traffic