

Draft Final Pavement Management Report



LiDAR



LCMS



Coring & Soil Testing



GPR

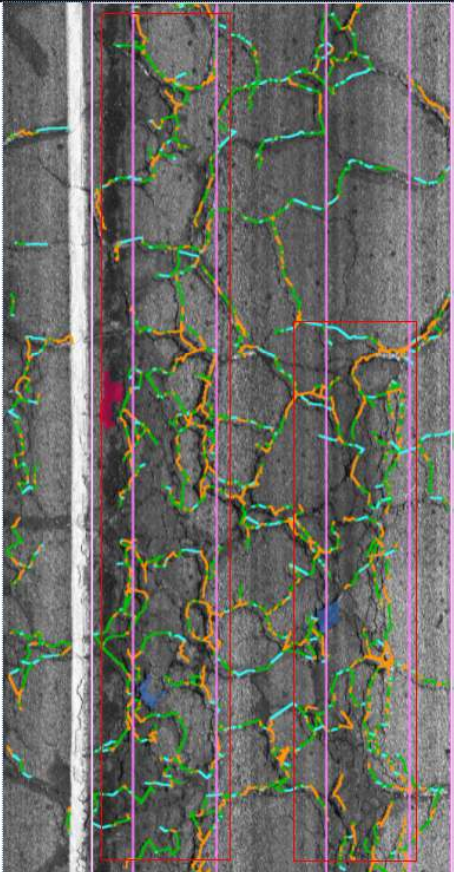


Reviewed 100,000+ Pavement Images for Pavement Distresses

Turlock_LCMS_2022 Distress Selector User Manual Turlock Distress Definitions BKR\

20211210_BAKER_Survey16 3D Show Overlay RID MP 0 Lat,Long 37.494759668214286,-120.8445175589286 Audit By BKR\Benjamin.Neff on 02/10/2022


Step 1 67245 Image 779 of 1,421



☐ Bridge ☐ Construction ☐ Lane Deviation ☐ Railway
 Surface Type **Asphalt** Shoulder Type **7-Barrier Curb** Thru Lanes **2**

Distress	X;Y Min	X;Y Max	Width (mm)	Height (mm)	Area (mm)	Created
Block Cracking	806,0	4089;8045	3,284	8,046	26,423,064	BKR\Benjamin.Neff, 02/10/2022
Alligator Cracking High	886,234	2074;7937	1,189	7,704	9,160,056	BKR\Benjamin.Neff, 02/10/2022
Alligator Cracking High	2641;216	3776;5144	1,136	4,929	5,599,344	BKR\Benjamin.Neff, 02/10/2022

[Comment +](#) Created



QC'ed 50%+ of Selected Distresses Performed QA and Validation Checks on Distresses

Turlock_LCMS_2022 Distress Selector User Manual Turlock Distress Definitions BKR\Vga

20211210_BAKER_Survey14 3D Show Overlay RID MP 0 Lat, Long 37.474028865, -120.82404536333333 Audit By BKR\Benjamin.Neff on 02/10/2022

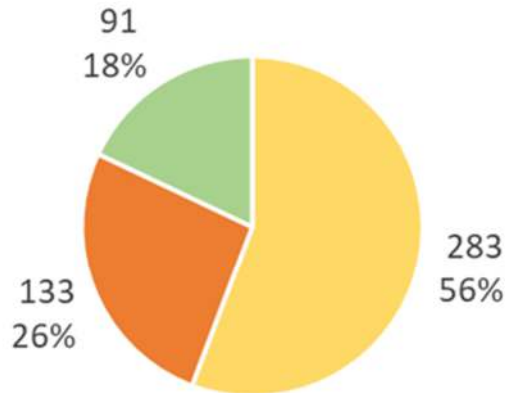
Step 1 64886 Image 33 of 1,048

Distress	X;Y Min	X;Y Max	Width (mm)	Height (mm)	Area (mm)	Created
Block Cracking	287;0	3944;8045	3,658	8,046	29,432,268	BKR\Benjamin.Neff, 02/10/2022
Alligator Cracking High	737;4563	1398;6399	662	1,837	1,216,094	BKR\Jibrael.Rana, 03/02/2022

Comment + Created

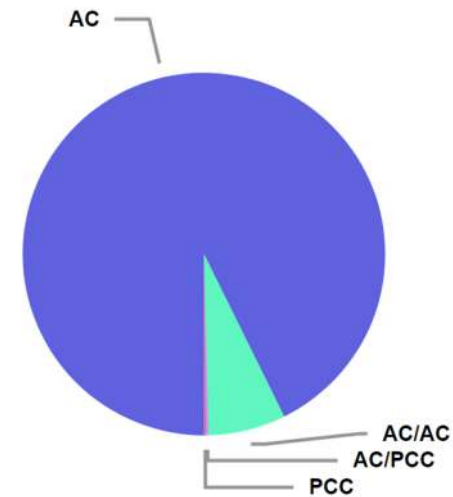
City of Turlock Pavement Network Statistics

Lane Miles by Functional Class



■ R - Residential/Local ■ C - Collector ■ A - Arterial

Lane Miles by Surface Type

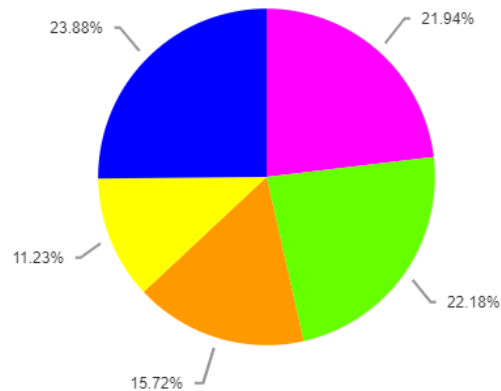


CATEGORY		%
AC		92.7
AC/AC		06.9
AC/PCC		00.2
PCC		00.2

>99.6% AC

Lane Miles by Districts

Inventory by Area ID and Lane Miles

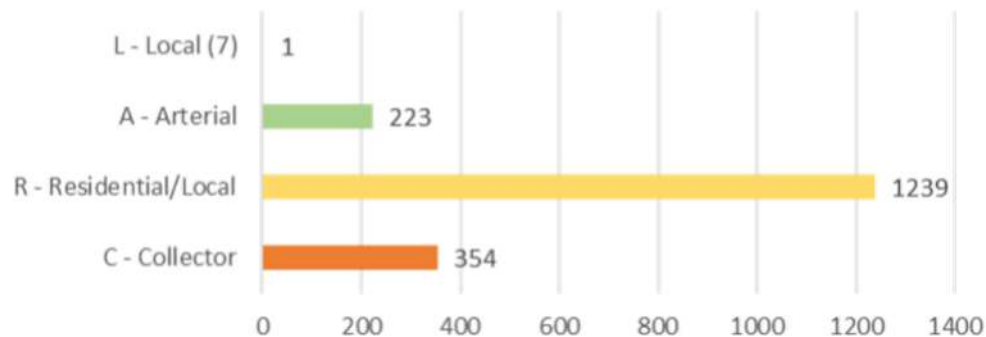


■ C2 - Council District 2 ■ C1 - Council District 1 ■ C4 - Council District 4 ■ C3 - Council District 3 ■ AD - Assessment Districts

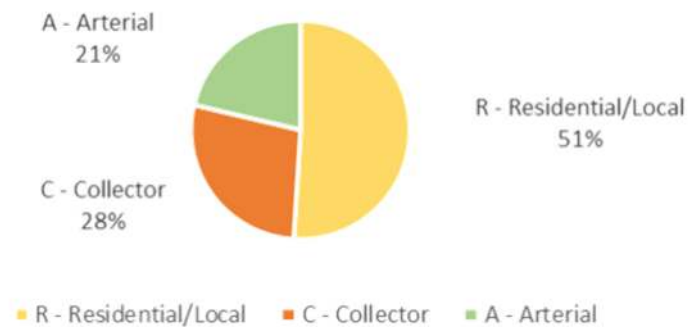
City of Turlock Pavement Network Statistics

	Total Sections	Total Center Miles	Total Lane Miles	Total Area (sq. ft.)	PCI
Arterial	223	43.54	91.26	10,972,335	62
Collector	353	66.52	133.25	14,211,589	54
Residential/Local	1,239	141.44	282.88	26,212,506	66
Local (7)	1	0.12	0.24	38,400	79
Total	1,816	251.62	507.63	51,434,830	
Overall Network PCI as of 5/5/2022:					62

Functional Classification Section Count

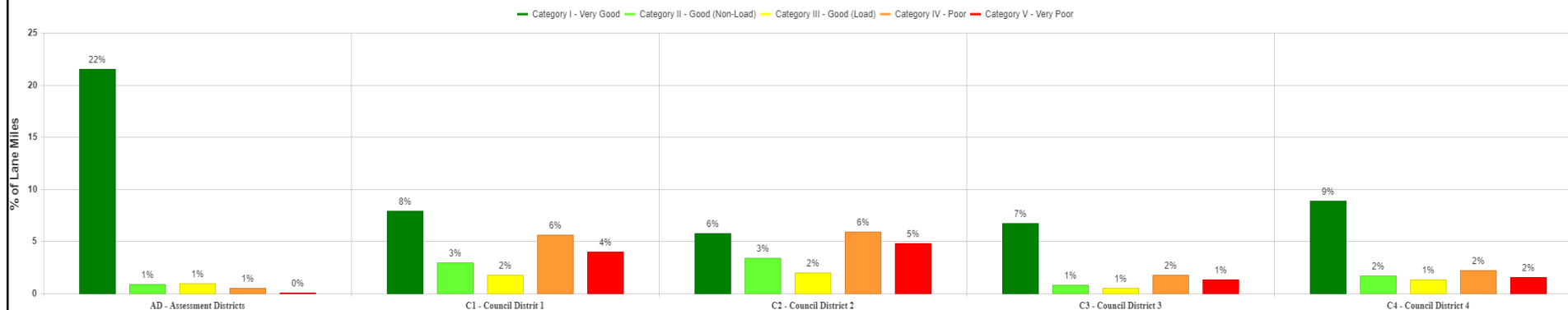


Percentage Area by Classification

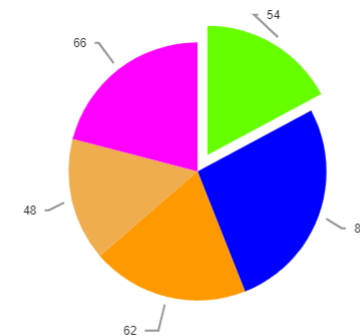


2022 Network Condition Categories by Functional Class and Lane Miles

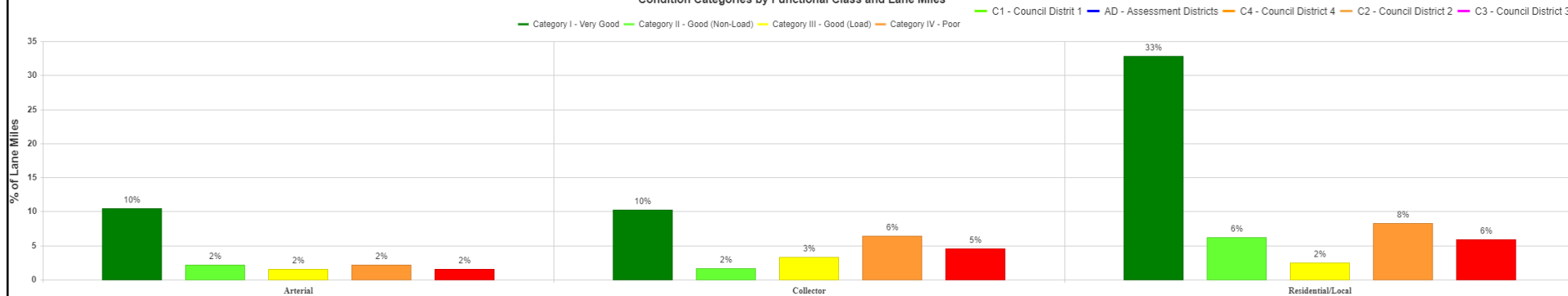
Condition Categories by Area ID and Lane Miles

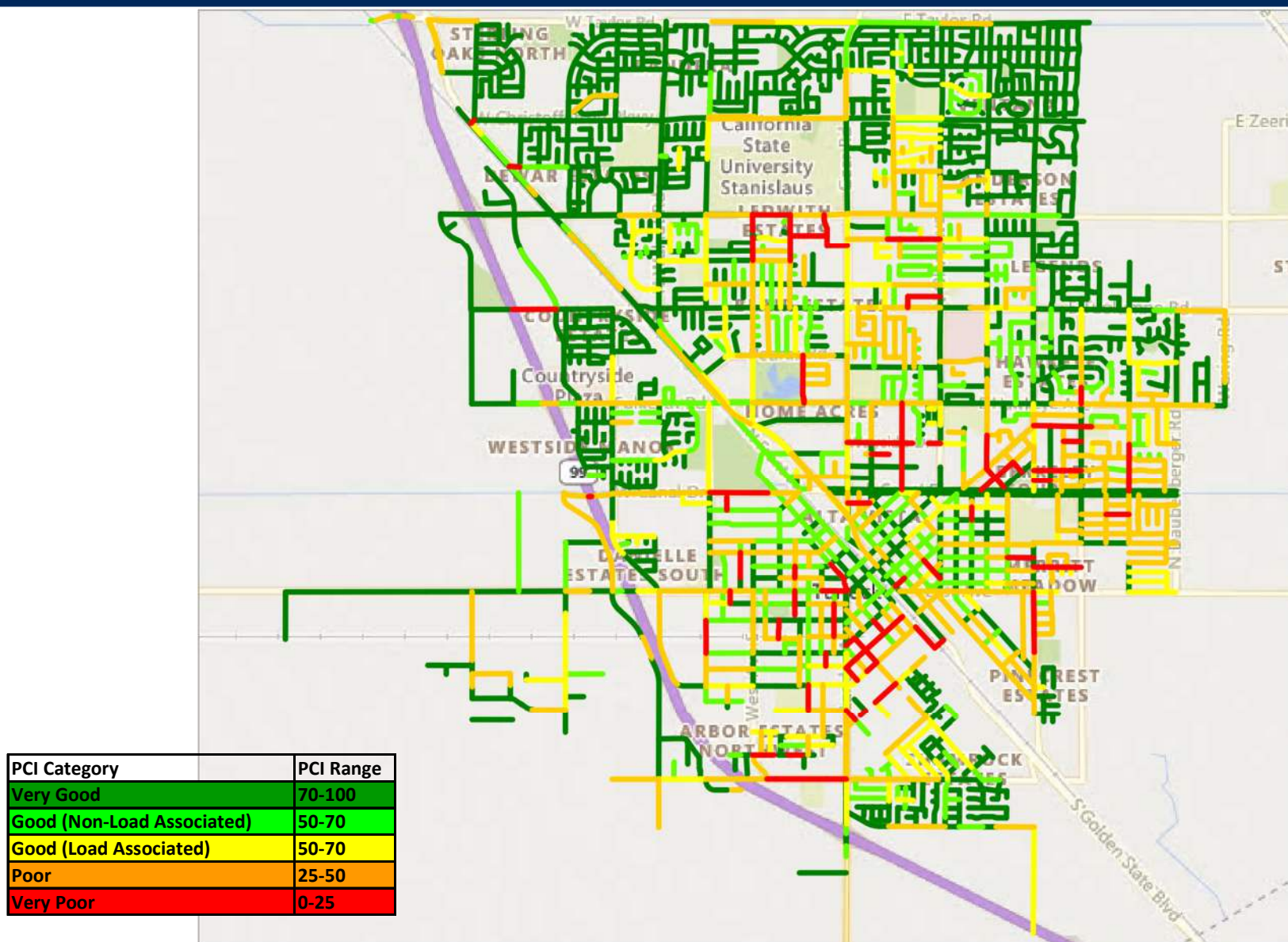


PCI Category	PCI Range
Very Good	70-100
Good (Non-Load Associated)	50-70
Good (Load Associated)	50-70
Poor	25-50
Very Poor	0-25

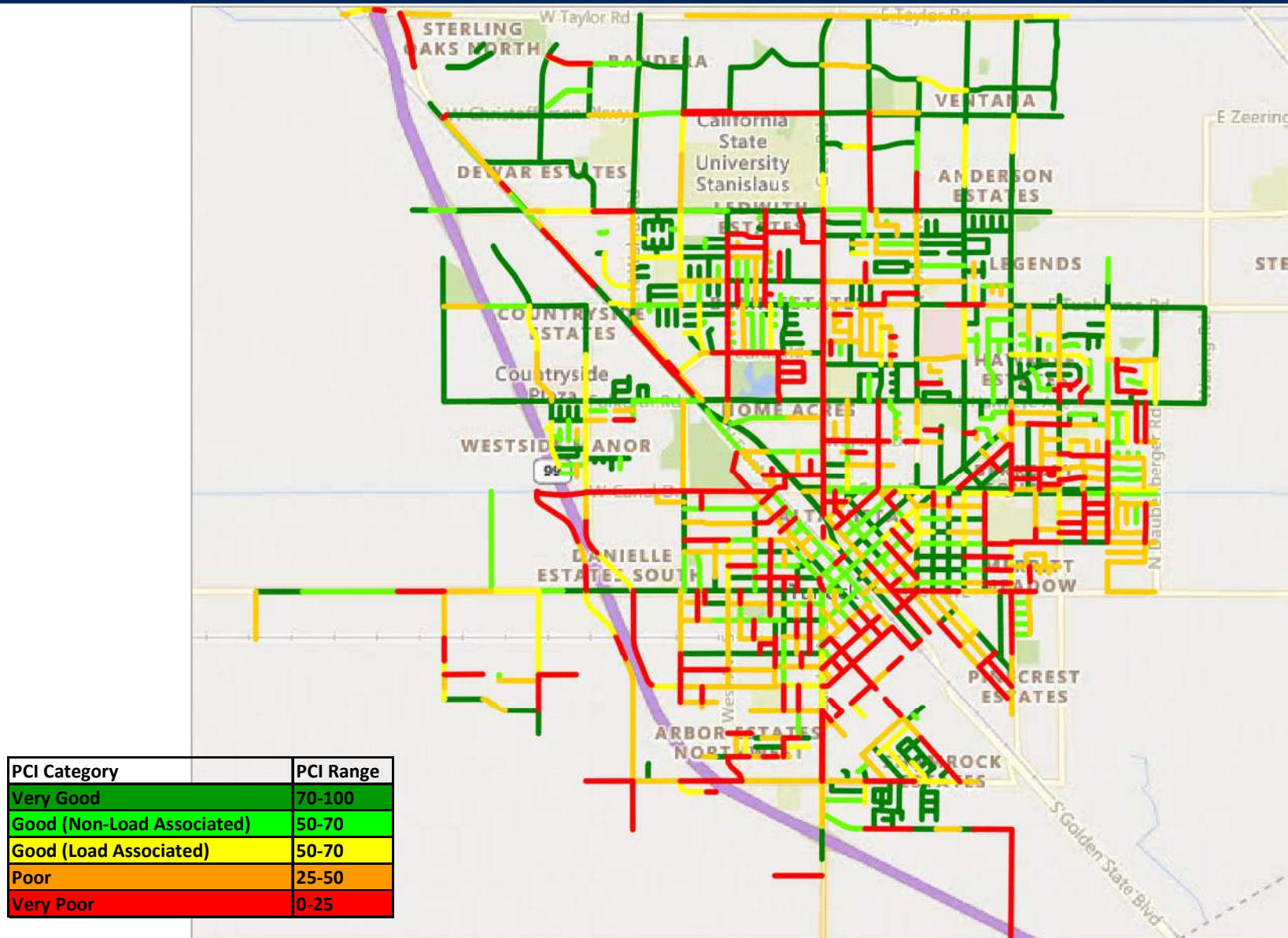


Condition Categories by Functional Class and Lane Miles

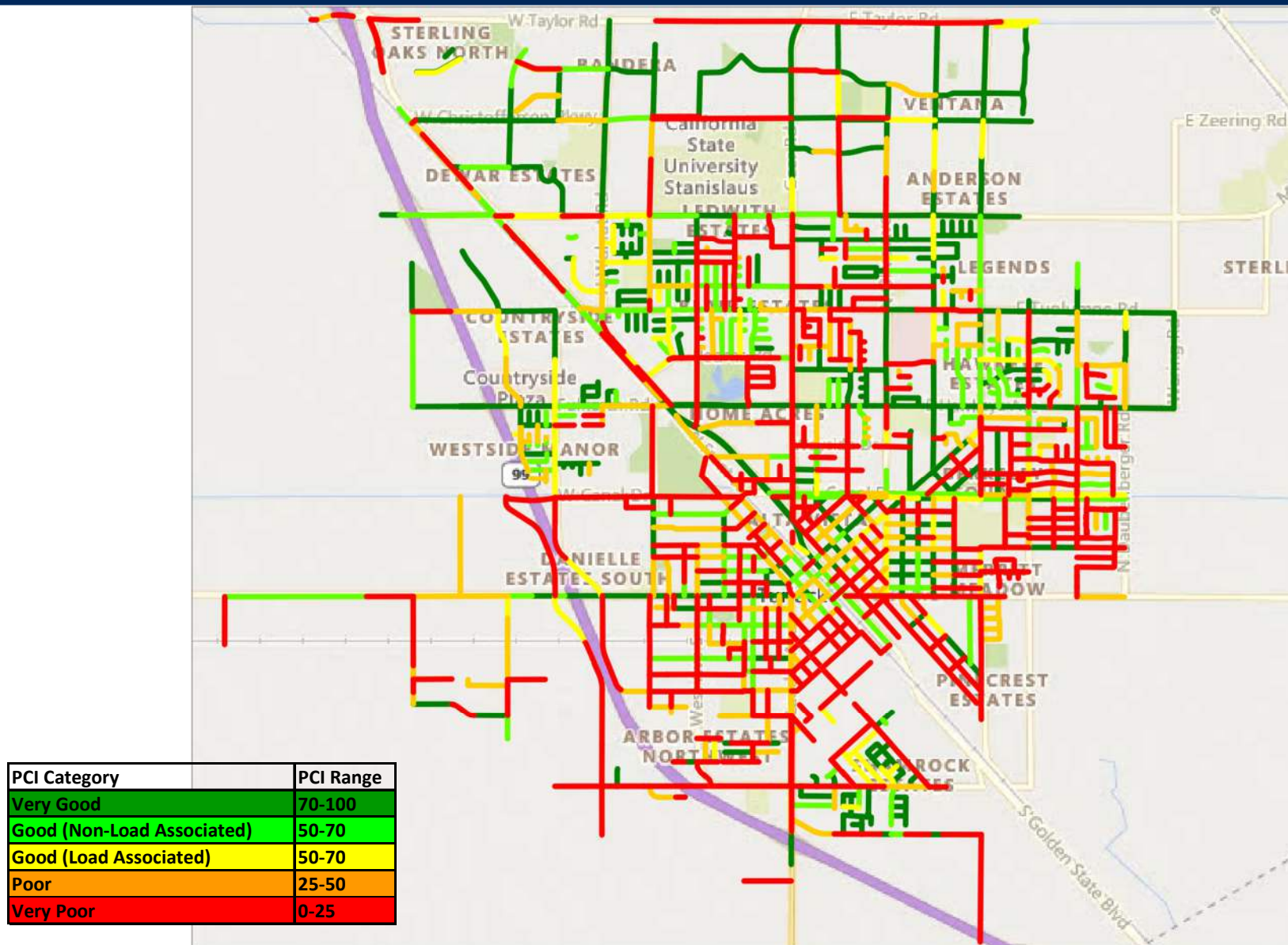




2013 Network Condition Map → PCI = 69

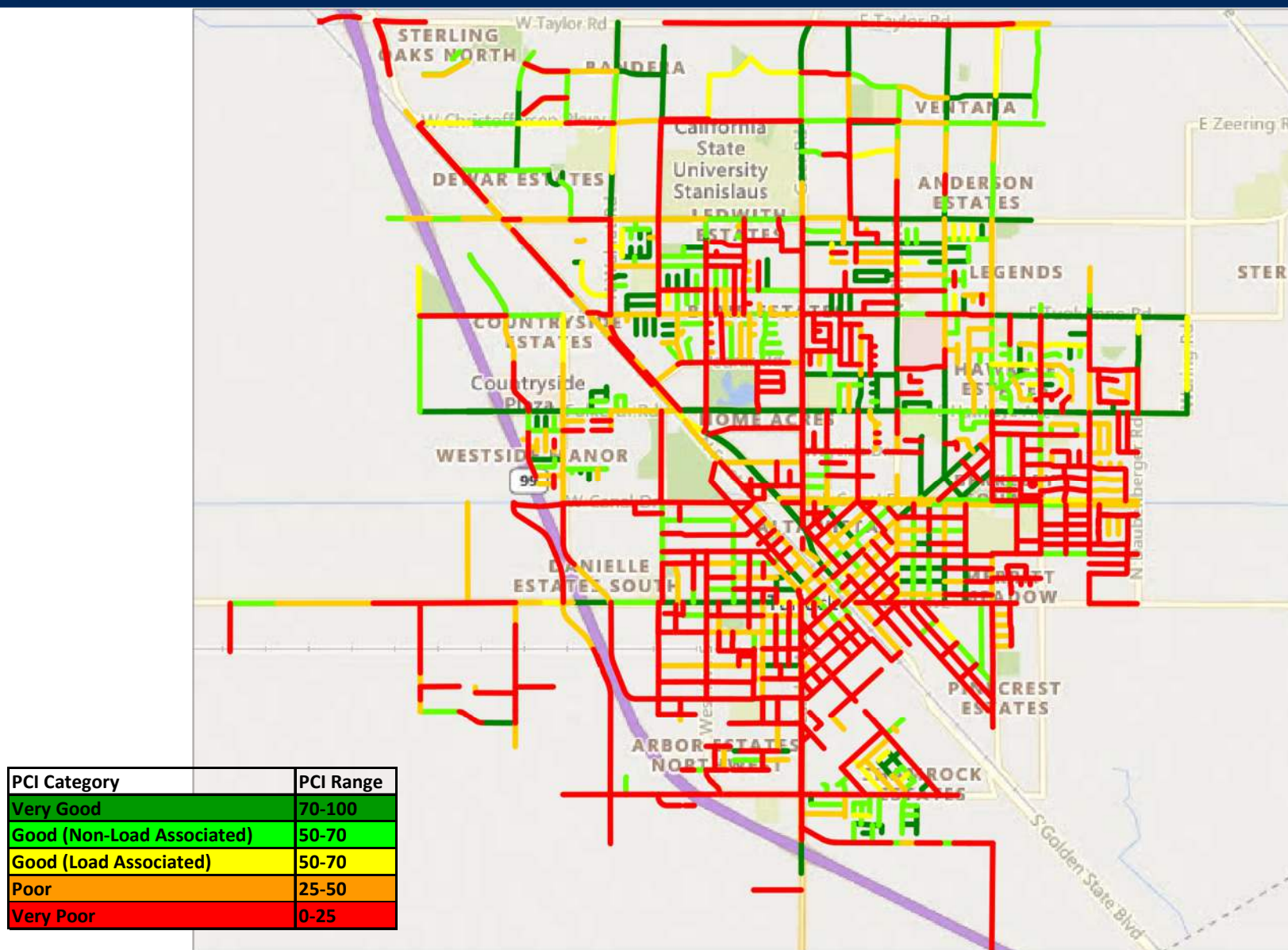


2022 Network Condition Map Excluding Assessment District → PCI = 62



2027 Network Condition with no Funding

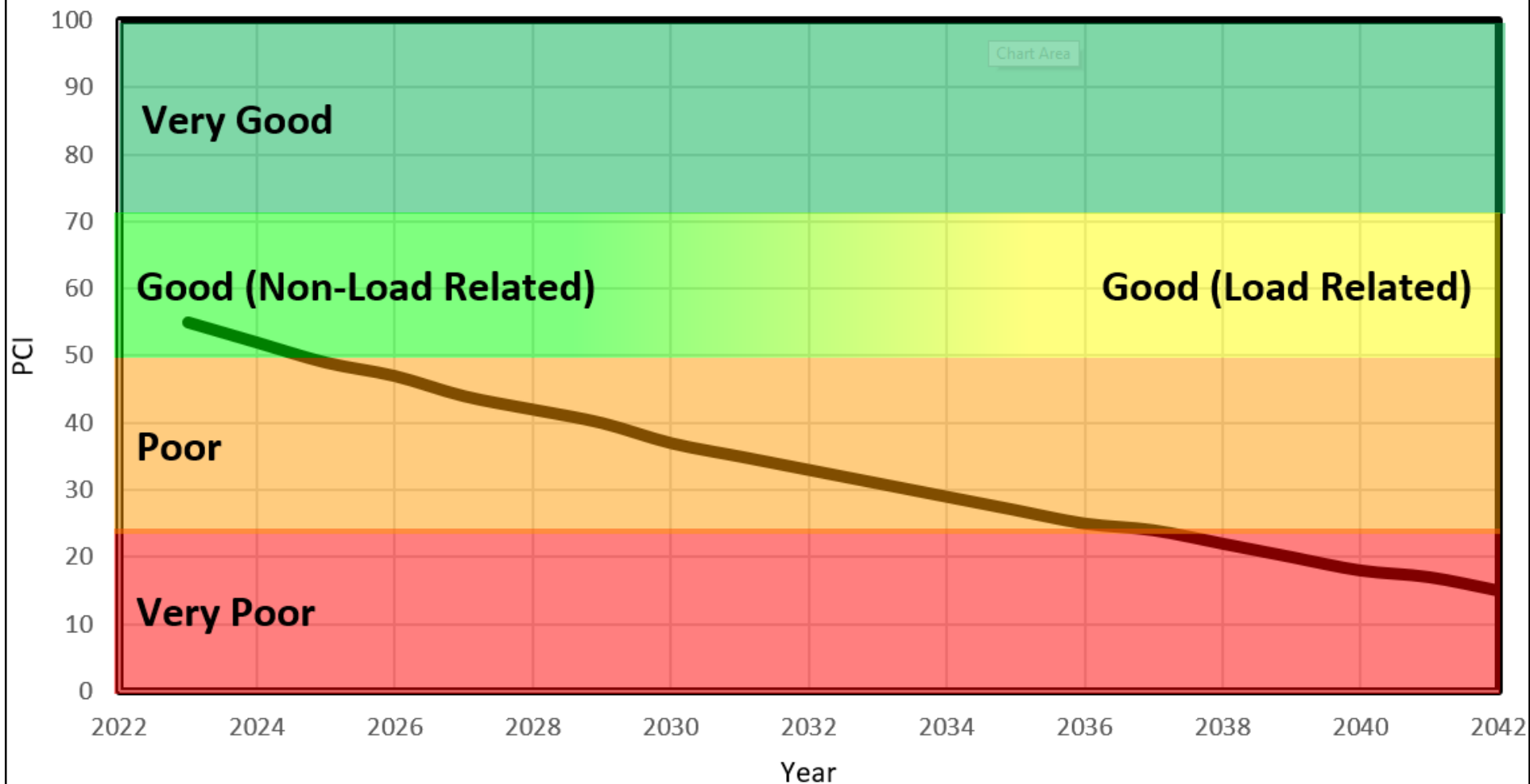
→ PCI = 44



2032 Network Condition with no Funding

→ PCI = 33

Predicted PCI from 2022 to 2032



Pavement Deterioration over Time with No Funding

Pavement deterioration over time with no funding.

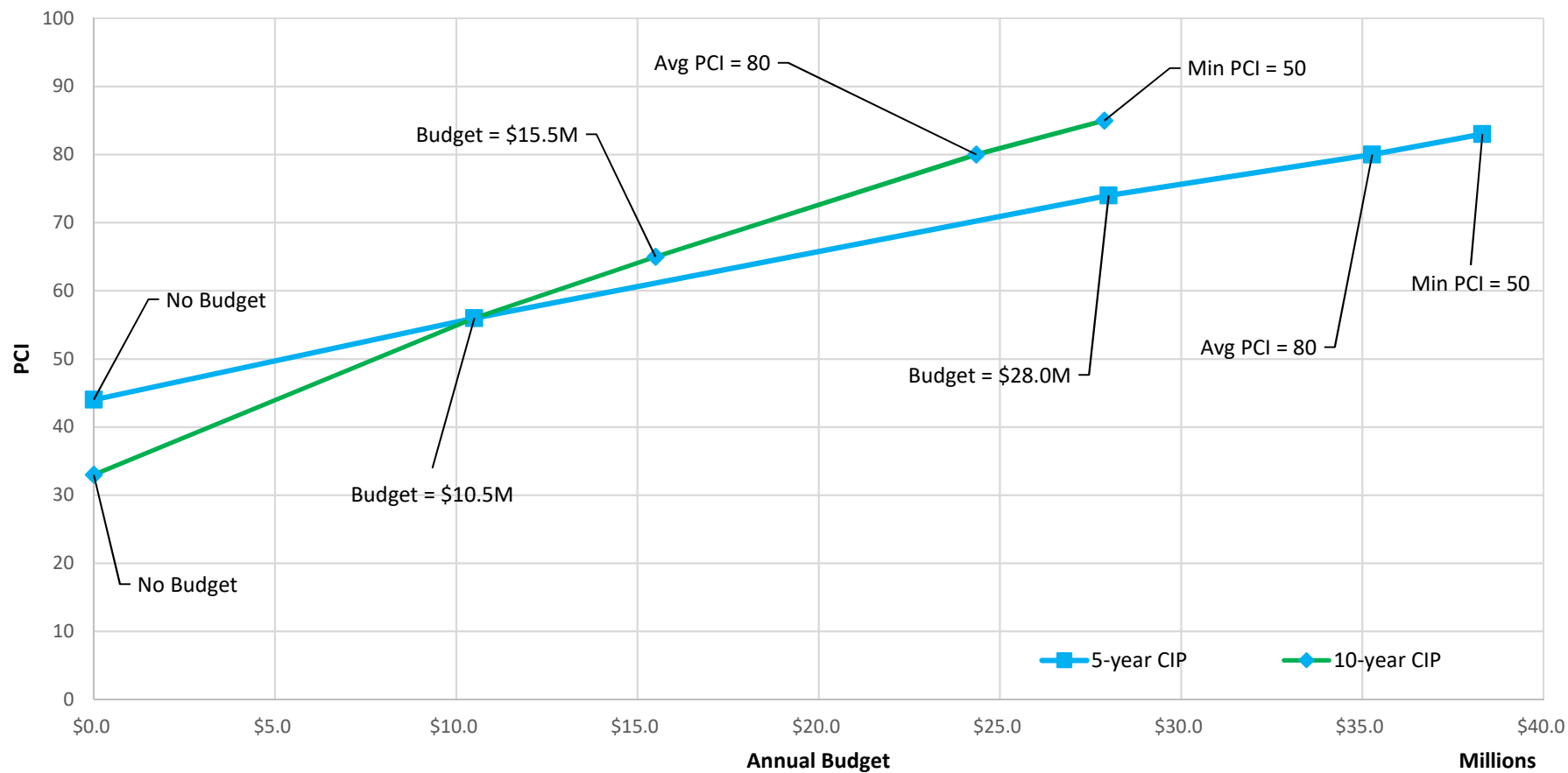
What to do to stop the deterioration? Provide funding for M&R → City
What street needs which treatment, when, and what is the cost → PMS

Once the PMS provides the cost for different scenarios and funding levels, the policy maker need to decide what level of funding is available and what level of network PCI is acceptable to the citizens

Turlock - Decision Tree 2022 Update

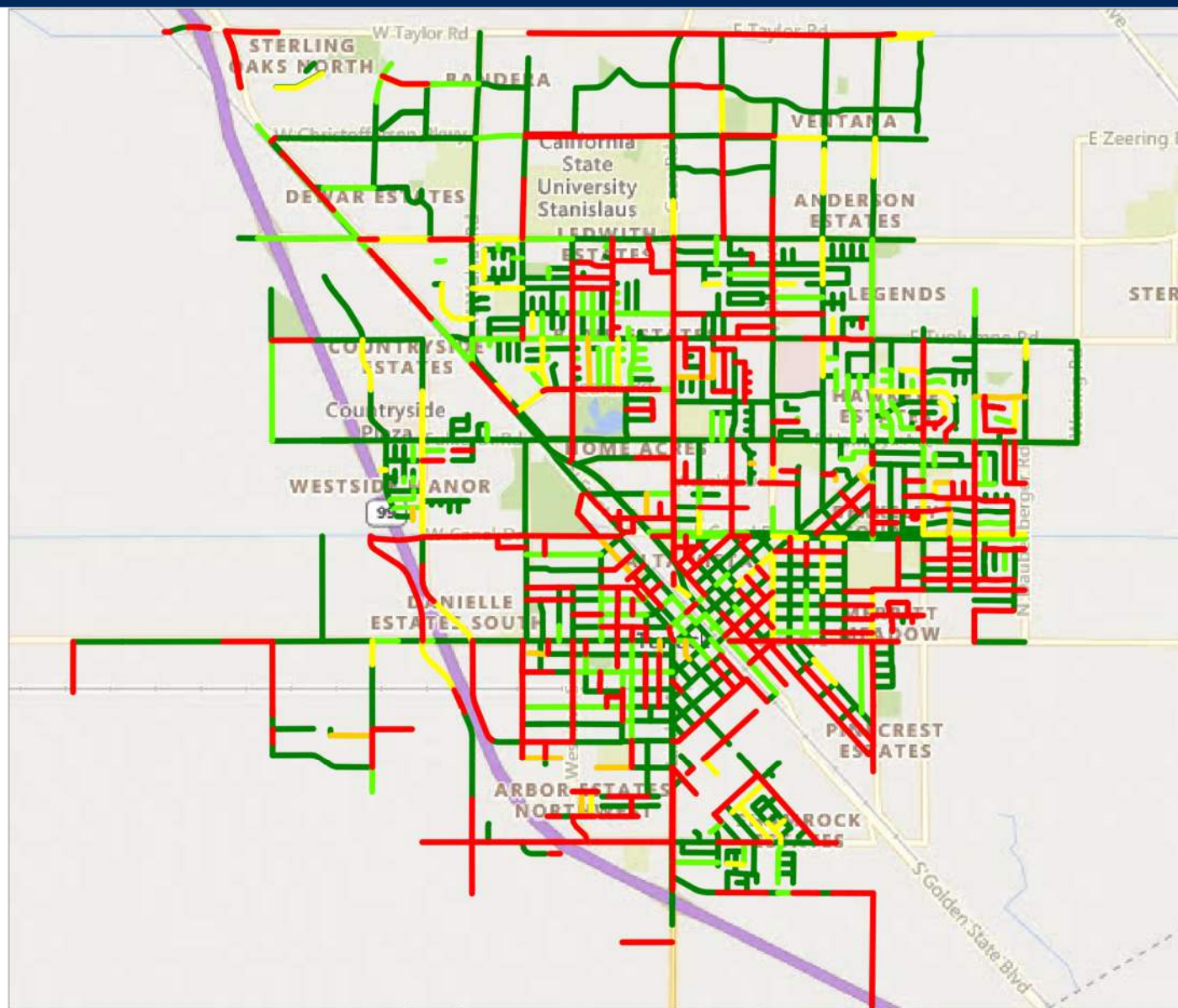
Surface Type	Condition Category	PCI Range	Functional Classification					
			Arterial	Est. Cost (\$/SY)	Collector	Est. Cost (\$/SY)	Residential	Est. Cost (\$/SY)
AC or AC/AC	I	70-100	Crack Seal	\$ 1.00	Crack Seal	\$ 1.00	Crack Seal	\$ 1.00
			Microsurfacing	\$ 12.00	Microsurfacing	\$ 10.00	Slurry Seal	\$ 8.00
			Do Nothing	\$ -	Do Nothing	\$ -	Do Nothing	\$ -
	II	50-69 (Non-Load)	Asphalt Rubber Cape Seal	\$ 25.00	Asphalt Rubber Cape Seal	\$ 23.00	Asphalt Rubber Cape Seal	\$ 21.00
	III	50-69 (Load)	AR Cape/TypeIII Micro/Digouts	\$ 37.00	AR Cape/TypeIII Micro/Digouts	\$ 33.00	AR Cape/TypeIII Micro/Digouts	\$ 29.00
	IV	25-49	3" Mill & HMA Overlay	\$ 50.00	3" Mill & HMA Overlay	\$ 46.00	3" Mill & HMA Overlay	\$ 40.00
	V	0-24	FDR w/5"HMA	\$ 78.00	FDR w/4"HMA	\$ 69.00	FDR w/3"HMA	\$ 57.00
			Reconstruct: 5"HMA/6"AB	\$ 102.00	Reconstruct: 4"HMA/6"AB	\$ 85.00	Reconstruct: 3"HMA/6"AB	\$ 67.00

Annual Budget vs. Final Network PCI for 5- and 10-Year CIP

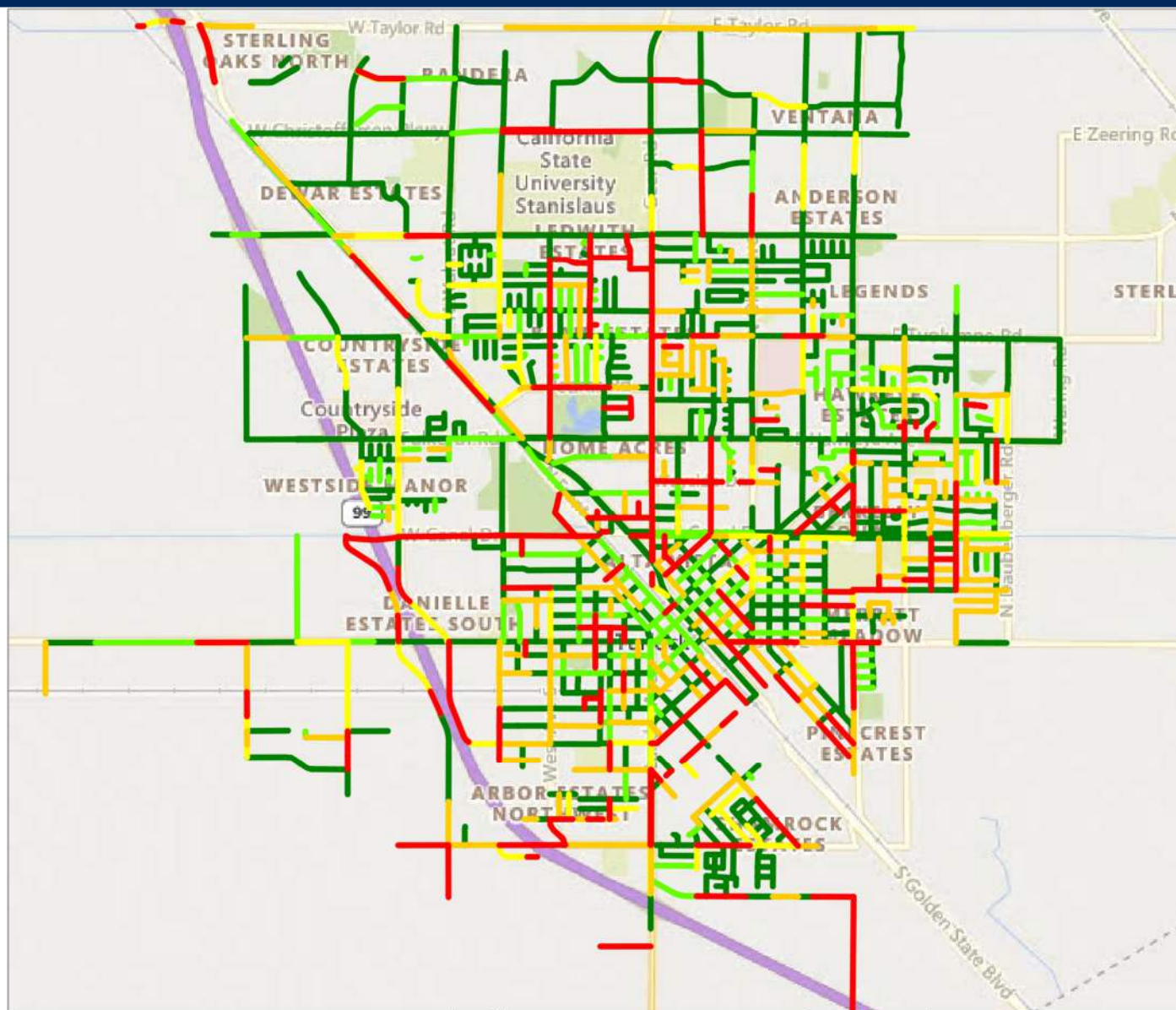


Summary of Various Scenarios for both 5- and 10-Year CIP

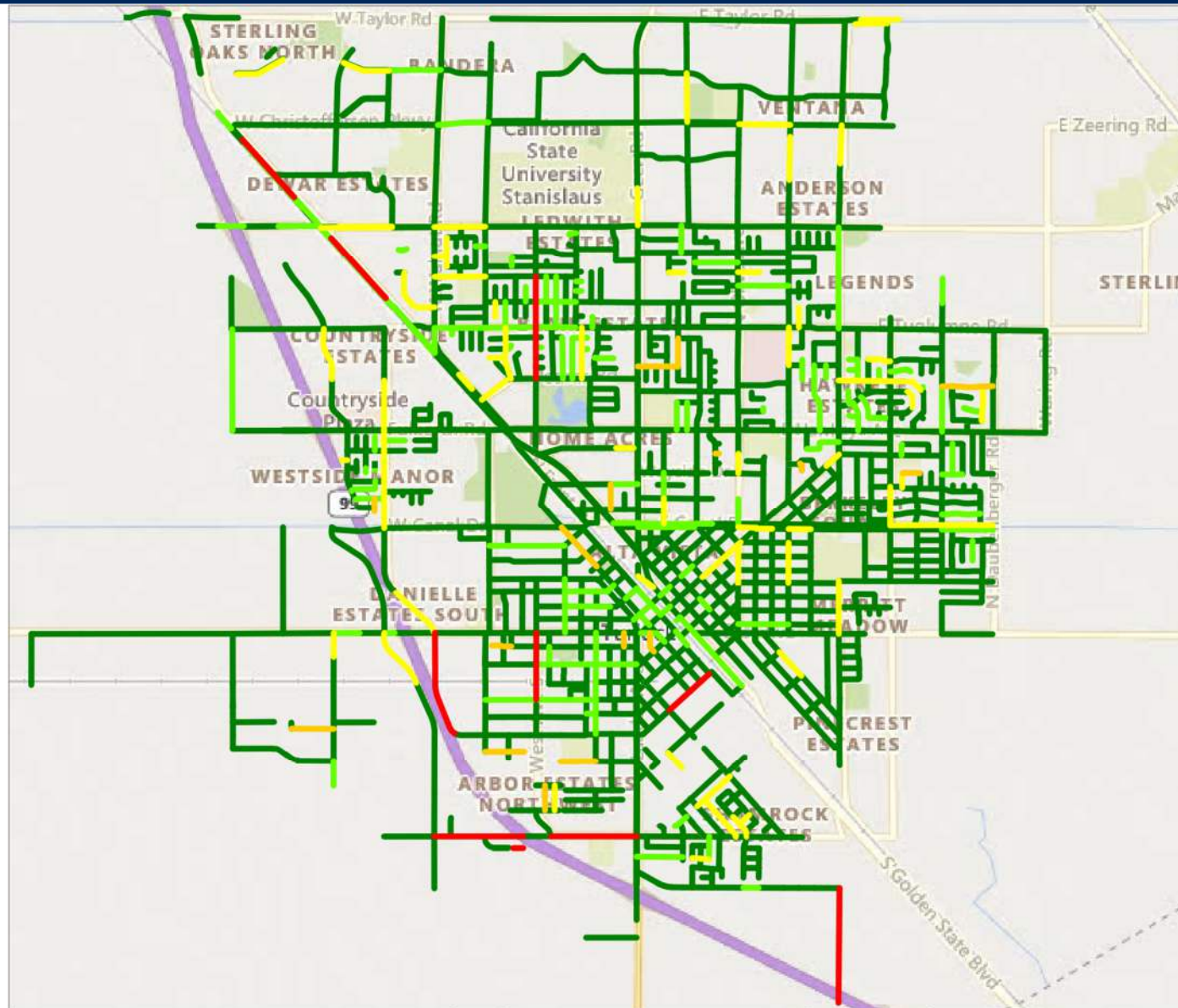
Scenario	CIP Period (yrs)	CIP Period	Final PCI with Treatment	Final PCI without Treatment	PCI Improvement	Annual Cost	Total Cost
Min. PCI = 70	5	2023-2027	84	44	40	\$40,541,266	\$202,706,328
Min. PCI = 50	5	2023-2027	83	44	39	\$38,309,508	\$191,547,538
Avg. PCI = 80	5	2023-2027	80	44	36	\$35,272,272	\$176,361,361
Budget = \$28.0M	5	2023-2027	74	44	30	\$28,000,000	\$140,000,000
Budget = \$10.5M	5	2023-2027	56	44	12	\$10,500,000	\$52,500,000
Do Nothing	5	2023-2027	44	44	0	\$0	\$0
Min. PCI = 70	10	2023-2032	83	33	50	\$27,471,284	\$274,712,842
Min. PCI = 50	10	2023-2032	85	33	52	\$27,880,552	\$278,805,522
Avg. PCI = 80	10	2023-2032	80	33	47	\$24,351,191	\$243,511,914
Budget = \$15.5M	10	2023-2032	65	33	32	\$15,500,000	\$155,000,000
Budget = \$10.5M	10	2023-2032	56	33	23	\$10,500,000	\$105,000,000
Do Nothing	10	2023-2032	33	33	0	\$0	\$0



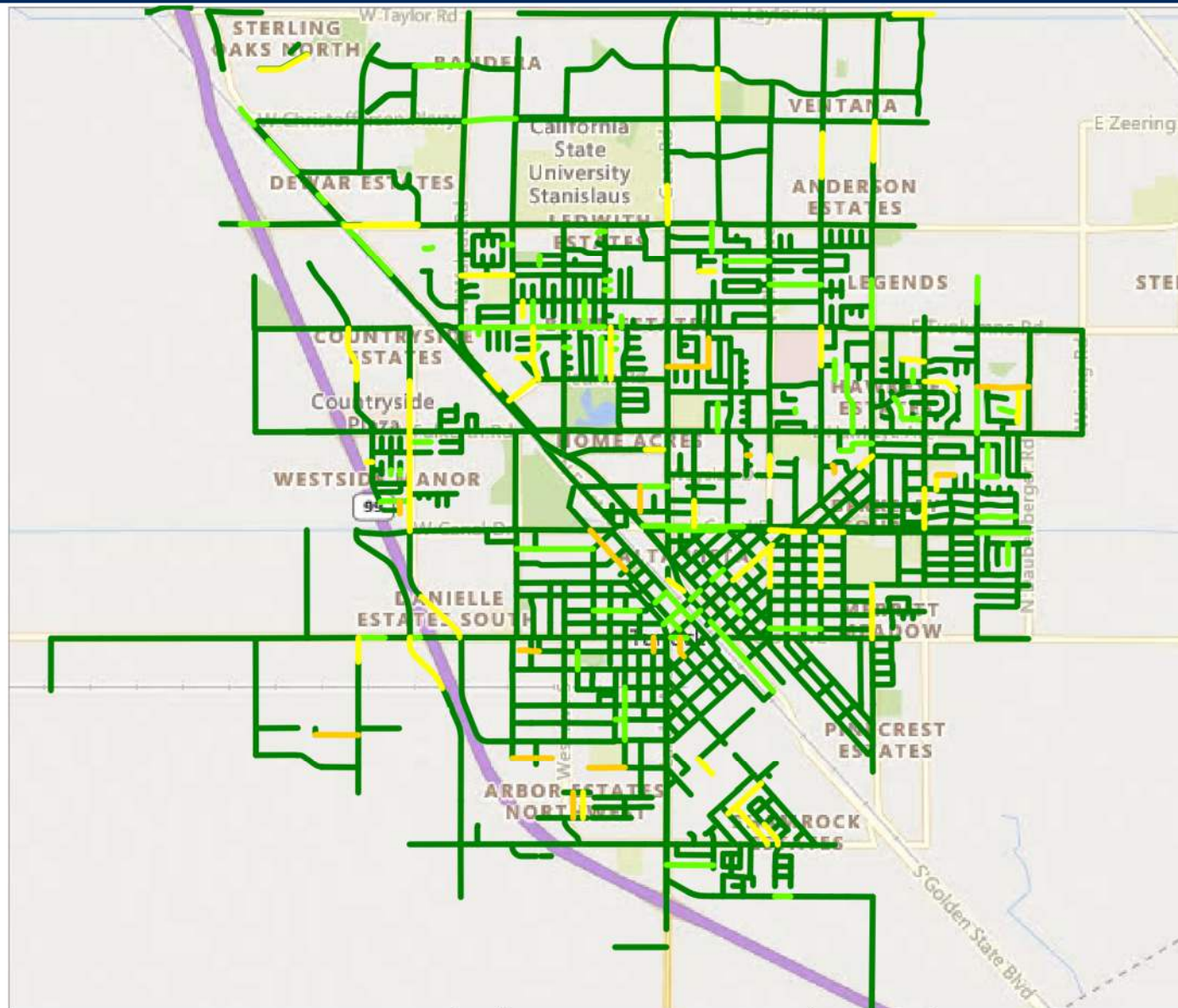
2027 PCI with \$10.5M Annual Funding → PCI = 56



2027 PCI with \$28.0M Annual Funding → PCI = 74



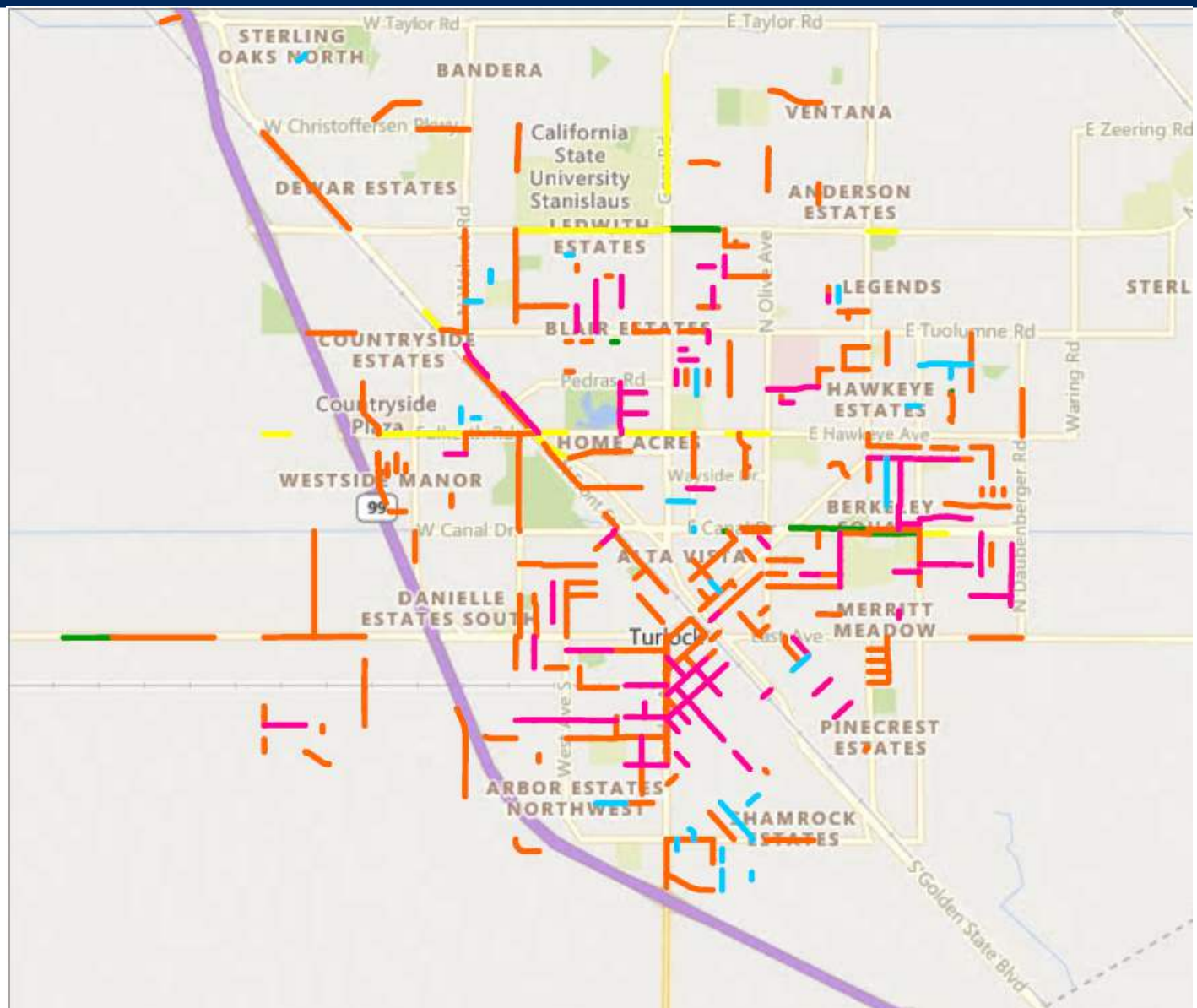
2027 PCI with \$35.3M Annual Funding → PCI = 80



2027 PCI with \$38.3M Annual Funding → PCI = 83

Feature Legend

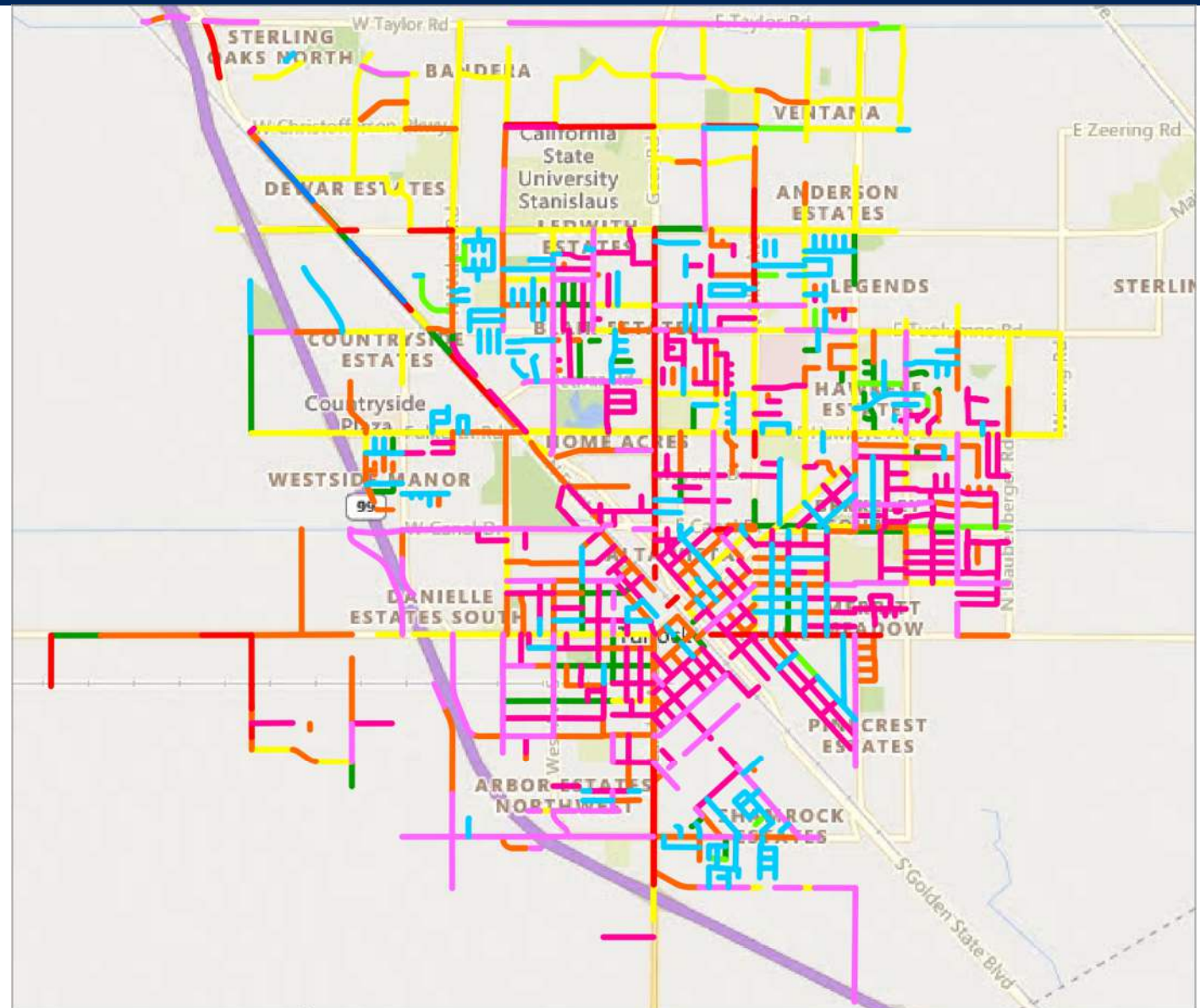
- AR CAPE SEAL
- MICROSURFACING
- MILL AND 3 IN OVERLAY
- Reconstruct with 3" HMA/6" AB
- SLURRY SEAL



2023-2027 Projects with \$10.5M Annual Funding → PCI = 56

Feature Legend

- AR CAPE SEAL
- AR CAPE SEAL W/DIGOUTS
- MICROSURFACING
- MILL AND 3 IN OVERLAY
- Reconstruct 5" HMA/6" AB
- RECONSTRUCT SURFACE (AC)
- Reconstruct with 3" HMA/6" AB
- Reconstruct with 4" HMA/6" AB
- SLURRY SEAL



2023-2027 Projects with \$38.3M Annual Funding → PCI = 83

	2023	2024	2025	2026	2027	All Years	
District 1	\$ 7,863,715	\$ 13,635,625	\$ 10,769,019	\$ 8,850,486	\$ 11,130,822	\$ 52,249,667	29%
District 2	\$ 8,114,208	\$ 9,950,773	\$ 10,772,259	\$ 17,682,229	\$ 16,530,165	\$ 63,049,634	35%
District 3	\$ 2,996,589	\$ 2,536,089	\$ 11,011,763	\$ 5,150,955	\$ 6,574,713	\$ 28,270,109	16%
District 4	\$ 4,468,503	\$ 4,464,135	\$ 7,804,951	\$ 5,931,458	\$ 11,766,551	\$ 34,435,598	19%
All Districts	\$ 23,443,015	\$ 30,586,622	\$ 40,357,992	\$ 37,615,128	\$ 46,002,251	\$ 178,005,008	100%
	13%	17%	23%	21%	26%	100%	

Executive Dashboard

Pavement Area (square miles): **1.84** | Centerline Miles: **251.66** | Lane Miles: **507.72** | Sections: **1817**

Historical Pavement Condition Trends



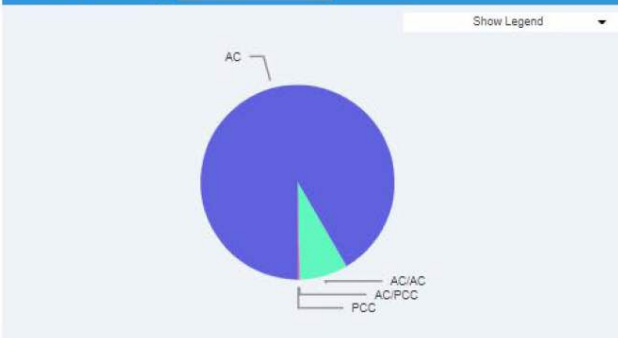
Current PCI by: Area ID



*Current PCI



Percent of Area by: Surface Type



Historical Network Condition Trends

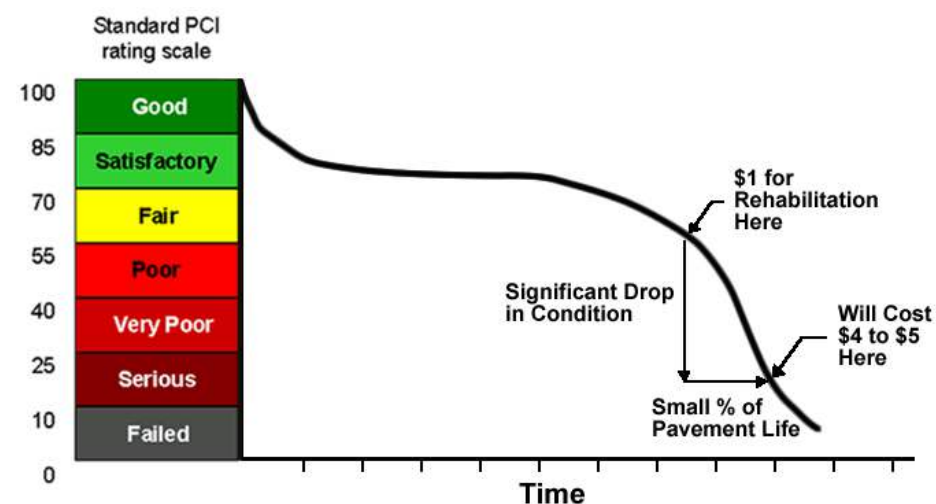


Remaining Service Life (years)



Pavement Preservation

- The **worse** the pavement condition is, the **more expensive treatment** is required to restore the pavement to **good** condition
- Pavement preservation is most **effective** when a pavement is **structurally sound** and exhibits little or no distress
- Considerably **inexpensive** compared to resurfacing or reconstruction projects



Thank You!

