City of Phoenix Pavement Management System

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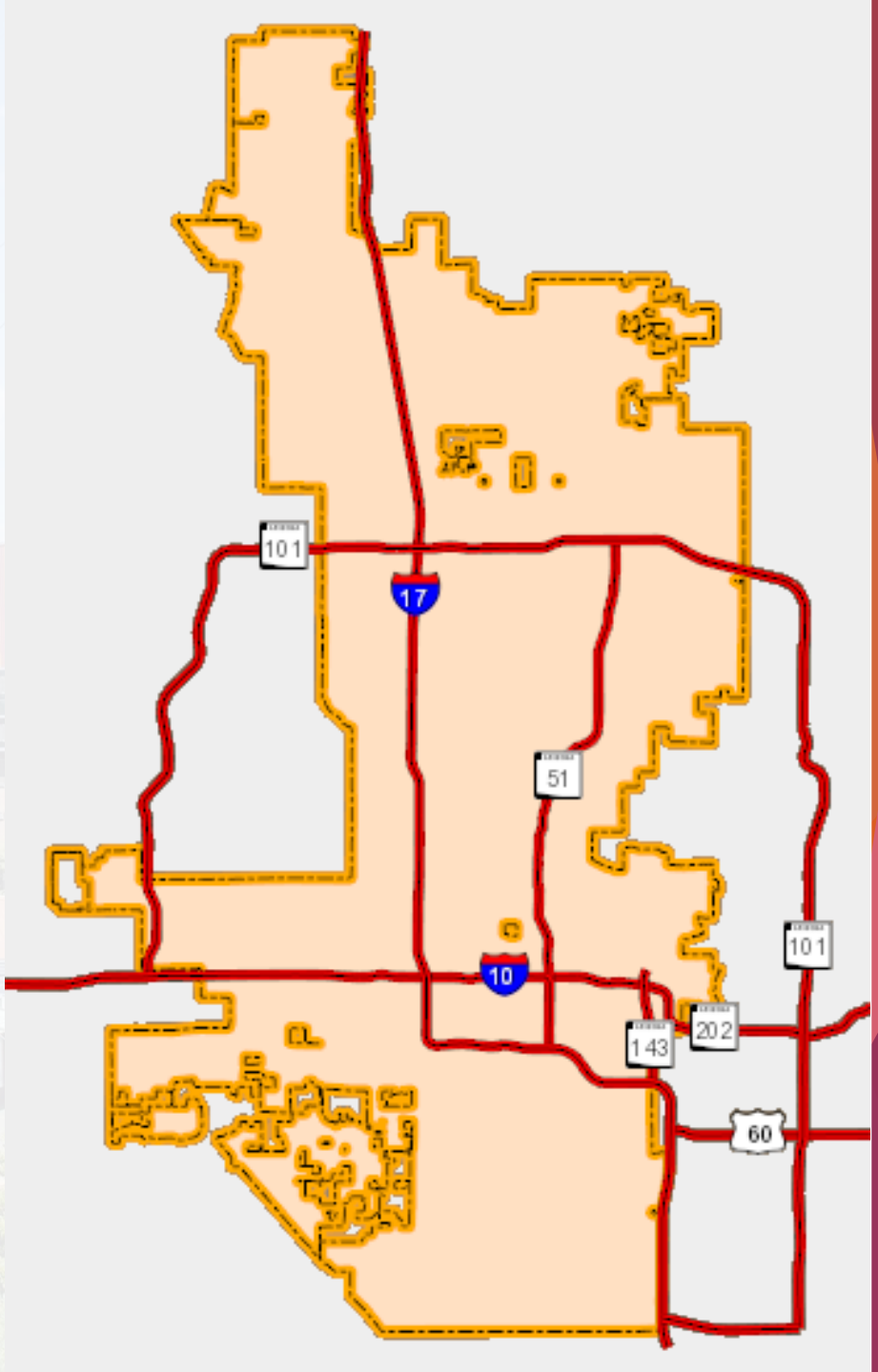
Civil Engineer III – Street Transportation Department

November 15, 2017

Outline

- City of Phoenix Street Network
- Automated data collection
- Distresses and Processing
- Pavement Management System
- Funding
- Implementation
- Going forward
- Questions

- 5th Largest City in the United States
- 1.6 Million residents
- 520 square mile land area
  - More than the top 3 Cities in the U.S. by population
    - New York City, Los Angeles, Chicago
- 8 Council districts
- Council-Manager form of Government



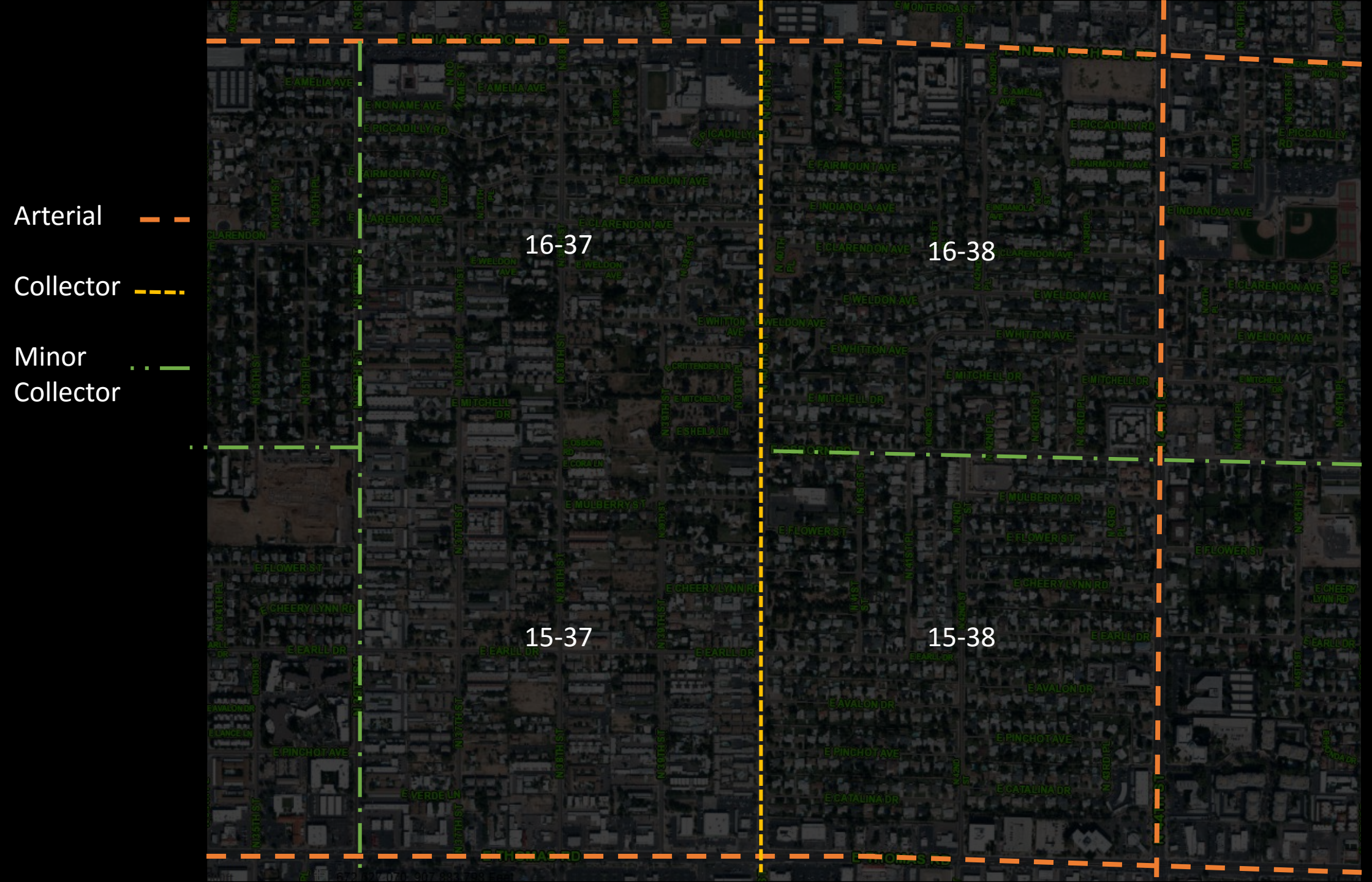
City of Phoenix Street Network

Arterial Street Network

- 900 centerline miles
- Arterial and Major Collector
- 1-mile segments

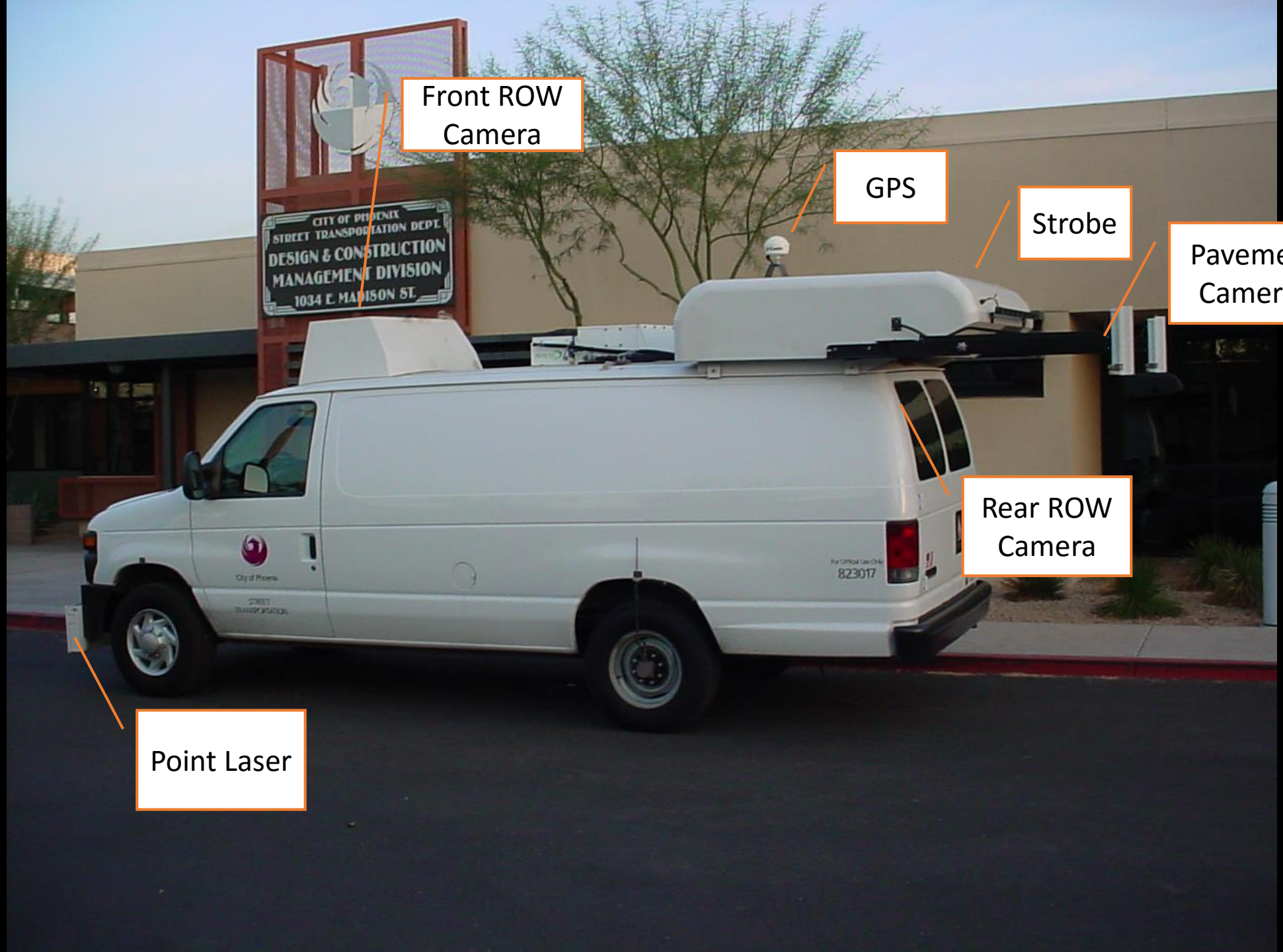
Local Street Network

- 3,900 centerline miles
- Residential, Industrial, Minor Collector
- Quarter Sections
  - ½ mile by ½ mile grid


Arterial
Collector
Minor Collector
16-37
16-38
15-37
15-38

Automated Data Collection

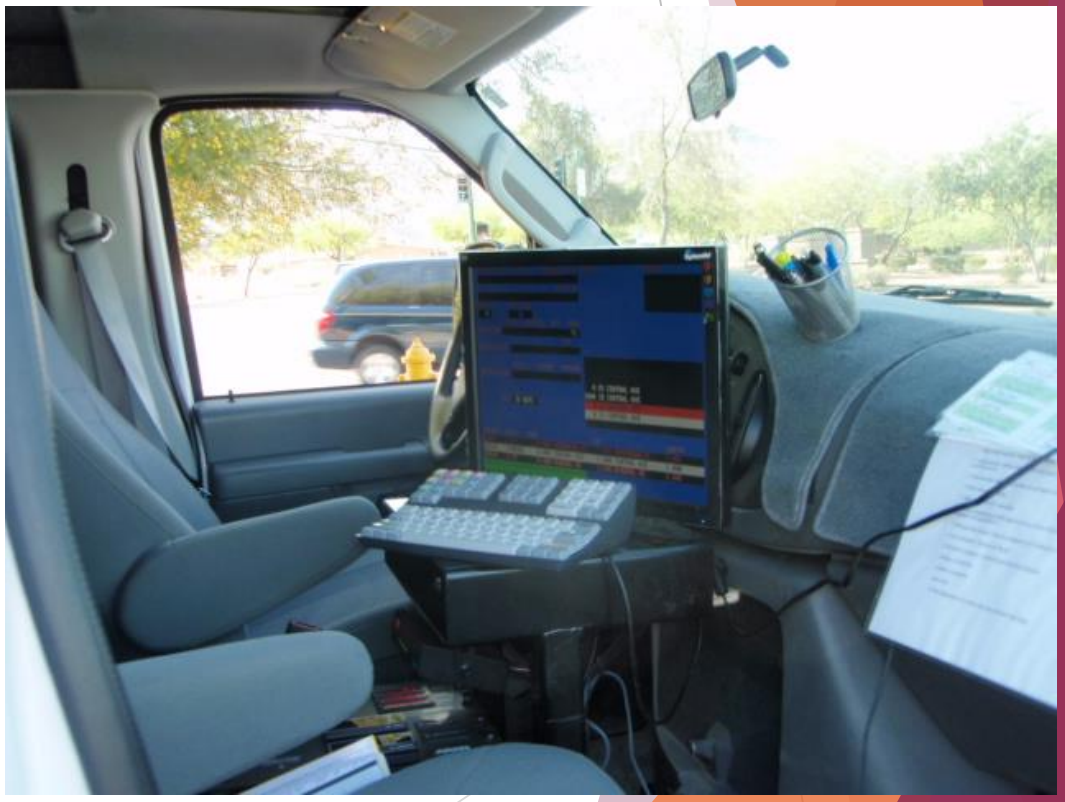
- Automated Road Analyzer (ARAN)
- Longitudinal Profile and Roughness (IRI)
- Surface Distress Rating
- Customizable rating protocol
- Uploaded to the PMS
- In use since 2008


Front ROW Camera
GPS
Strobe
Pavement Cameras
Rear ROW Camera
Point Laser
CITY OF PHOENIX
STREET TRANSPORTATION DEPT.
DESIGN & CONSTRUCTION
MANAGEMENT DIVISION
1034 E. MADISON ST.
823017


ARAN
UNI CARRIERS


ARAN
SPRINTER
2500

- Input Pavement Management Sections
  - Electronic Field Sheets for all Major/Collector roads already loaded in ARAN database
- Residential/Industrial are loaded manually during rating



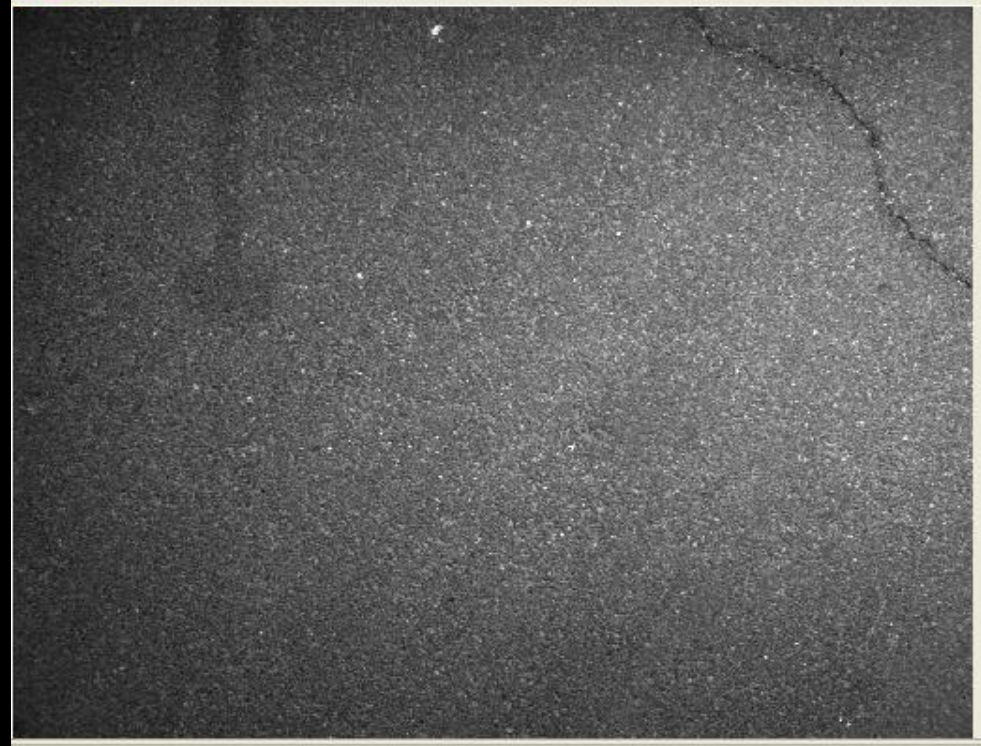
There are 7 computers that operate the different systems responsible comprehensive data collection:

- Central Data Acquisition
- Pavement Images
- Front Right of Way
- Rear Right of Way
- GPS data
- SVC-Survey
- Laser SDP

- Takes high definition pictures of the ROW from the front and back of the van.
- Takes high definition pictures of pavement.
- Collects roughness (IRI) with laser in wheel paths.
- Measures distance, along with GPS coordinates.
- Manually enter raveling and bleeding, if any.
- Collects data at posted speed limit with a minimum speed of 15 mph and a maximum of 65 mph.

BETA STORM - STORM V1.76 - Pavement Video Capture - 95C0E000.1M0

Speed: 0.0 mph 0.000 0000



Capturing Primed

Status | Performance | Capture Settings | Display Settings | History | Collection Options | Directories | Alarms | Camera Control | Auto Iris

Notepad

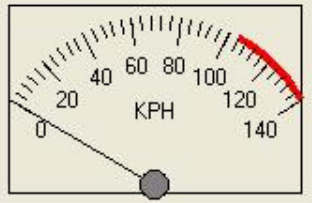
Clear

Auto Save to Disk

Render as Speech

1:16:50 PM-> Left Camera shutter speed set to = 1 / 50000
1:16:50 PM-> Right Camera shutter speed set to = 1 / 50000
1:16:50 PM-> Active Cameras set to 'Left & Right'
1:16:50 PM-> Left Camera exposure mode = Fixed Shutter
1:16:50 PM-> Right Camera exposure mode = Fixed Shutter
1:16:50 PM-> Left Camera shutter speed set to = 1 / 50000
1:16:50 PM-> Right Camera shutter speed set to = 1 / 50000
1:16:50 PM-> Left Camera HD Reset On
1:16:50 PM-> Right Camera HD Reset On
1:16:51 PM-> ProcessImageThread (0x7bc) ACTIVE @ tpNormal
1:16:51 PM-> ProcessMessageThread (0x120) ACTIVE @ tpNormal
1:16:51 PM-> triggerThread (0x154) ACTIVE @ tpNormal
1:16:51 PM-> CaptureThread (0x148) ACTIVE @ tpNormal
1:16:51 PM-> stitchThread (0x150) ACTIVE @ tpNormal
1:18:03 PM-> 95C0E000.1M0
1:18:03 PM-> Capturing Primed

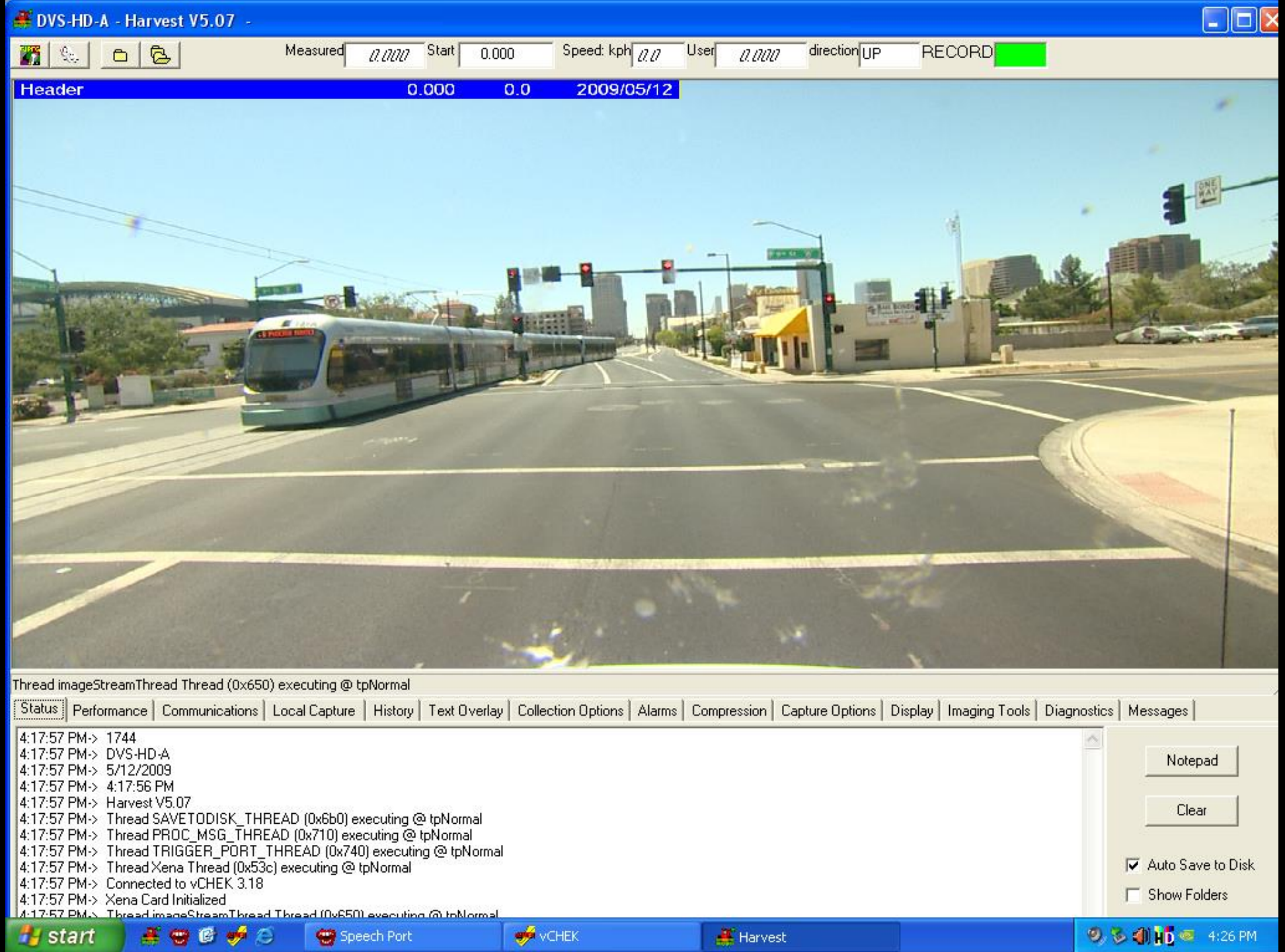
Status



Speed Alarm

Frames - 1501

start STORM 1:18 PM


DVS-HD-A - Harvest V5.07 -
Measured
Start
0.000
Speed: kph
User
direction
UP
RECORD
Header
0.000
0.0
2009/05/12
Thread imageStreamThread Thread (0x650) executing @ tpNormal
Status
Performance
Communications
Local Capture
History
Text Overlay
Collection Options
Alarms
Compression
Capture Options
Display
Imaging Tools
Diagnostics
Messages
4:17:57 PM-> 1744
4:17:57 PM-> DVS-HD-A
4:17:57 PM-> 5/12/2009
4:17:57 PM-> 4:17:56 PM
4:17:57 PM-> Harvest V5.07
4:17:57 PM-> Thread SAVETODISK_THREAD (0x6b0) executing @ tpNormal
4:17:57 PM-> Thread PROC_MSG_THREAD (0x710) executing @ tpNormal
4:17:57 PM-> Thread TRIGGER_PORT_THREAD (0x740) executing @ tpNormal
4:17:57 PM-> Thread Xena Thread (0x53c) executing @ tpNormal
4:17:57 PM-> Connected to vCHEK 3.18
4:17:57 PM-> Xena Card Initialized
Notepad
Clear
Auto Save to Disk
Show Folders
start
Speech Port
vCHEK
Harvest
4:26 PM

Distresses and Processing

Pavement Distresses

- Cracking
  - Longitudinal
  - Transverse
  - Fatigue (alligator)
  - Roughness (IRI)

Severity

- High
- Medium
- Low

Operator can also note bleeding and raveling in particular areas

Roadware Vision

File View Tools Help

Connect | Segment | Rate | Process | Map | Images | Panoramic View | Charts | Tables | Report | Publish | Plug-Ins | Distress schema | Bookmarks

Map

Search

E Phelps Rd, E Aire Libre Ave, E Grandview Rd, N 7th Pl, N 9th Pl, N 11th Pl, N 14th St, Paradise Ln, Marche Ave, E Le Marche Ave, N 12th St, N 13th St, E Marconi Ave, N 6th Pl, N 8th St, N 7th St, N 4th St, E Waltann Ln, E Beck Ln, N 8th Way, N 10th Pl, N 11th St, E Braeburn Dr, E Forest Hills Dr, N 12th St, E Deepdale Rd, E Acoma Dr, N 9th St, N 6th St, E Meadow Ln, E Rowlands Ln, Gold Key Estates, N 11th St, E Hearn Rd, Fairway at the Pointe, E Friess Dr, E Roberts Rd, E Canterbury Ln, N 12th Pl

Web Connection

Pavement | Section Explorer

W/S Speed 60 | 172.653 | 0.000 | Hot keys

Distress
- Line
  - Transversal
    - Trans_Low
    - Trans_Mod
    - Trans_High
  - Longitudinal
    - LongNWP_Low
    - LongNWP_Mod
    - LongNWP_High
    - LongWP_Low
    - LongWP_Mod
    - LongWP_High
- Area
  - Fatigue_Low
  - Fatigue_Mod
  - Fatigue_High
- Point

ID	Category	Type	Severity	Start	End	Manual	Crack
1	Longitudinal	LongNWP_Low	Low	0.001	10.000		
2	Transversal	Trans_Low	Low	3.907	9.901		
3	Longitudinal	LongNWP_Low	Low	10.001	20.000		
4	Transversal	Trans_Low	Low	10.201	19.777		
5	Longitudinal	LongNWP_Low	Low	20.001	30.000		
6	Transversal	Trans_Low	Low	20.563	29.777		
7	Longitudinal	LongNWP_Low	Low	30.001	40.000		
8	Transversal	Trans_Low	Low	30.581	39.950		
9	Longitudinal	LongNWP_Low	Low	40.001	50.000		
10	Transversal	Trans_Low	Low	40.676	49.971		
11	Longitudinal	LongNWP_Low	Low	50.001	60.000		
12	Transversal	Trans_Low	Low	50.471	59.097		

Hide Inactive | Show ID | Show Type | Show Auto Rating | Export

Metric	Value	Unit
CrackCount	168.000	count
SealedCount		
DistressCount	28.000	
CrackArea	299.195	ft²
CrackLength	192.228	ft

#	Type	Start	End	CrackCount
1	Longitudinal	0.001	0.082	0.00
2	Longitudinal	0.001	0.201	0.00
3	Longitudinal	0.137	0.237	0.00
4	Longitudinal	0.144	0.223	0.00
5	Longitudinal	0.165	0.244	0.00

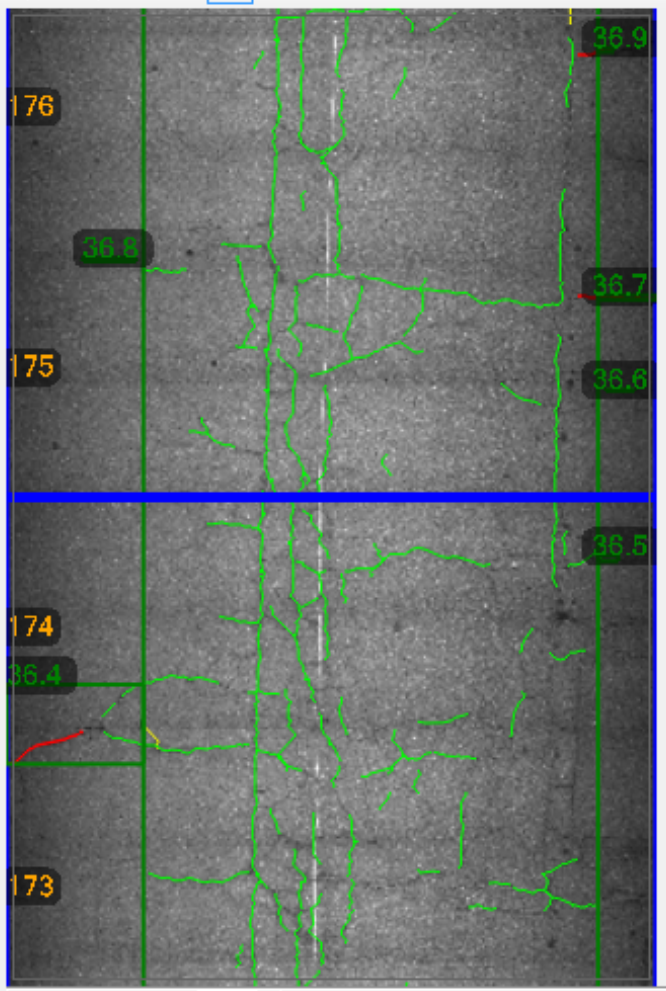
Magnify | Distresses | Cracks | Statistics

ROW

Custom | 10.0 | Speed | 174.53

ONE\dcmpms | DeptPrd12\DeptPrd12 | Maj_Col_2016 | Blank Workspace

Pavement | Section Explorer



W/S Speed 60 | 172.653 | 0.000 | Hot keys

- Distress
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    - Transversal
      - Trans_Low
      - Trans_Mod
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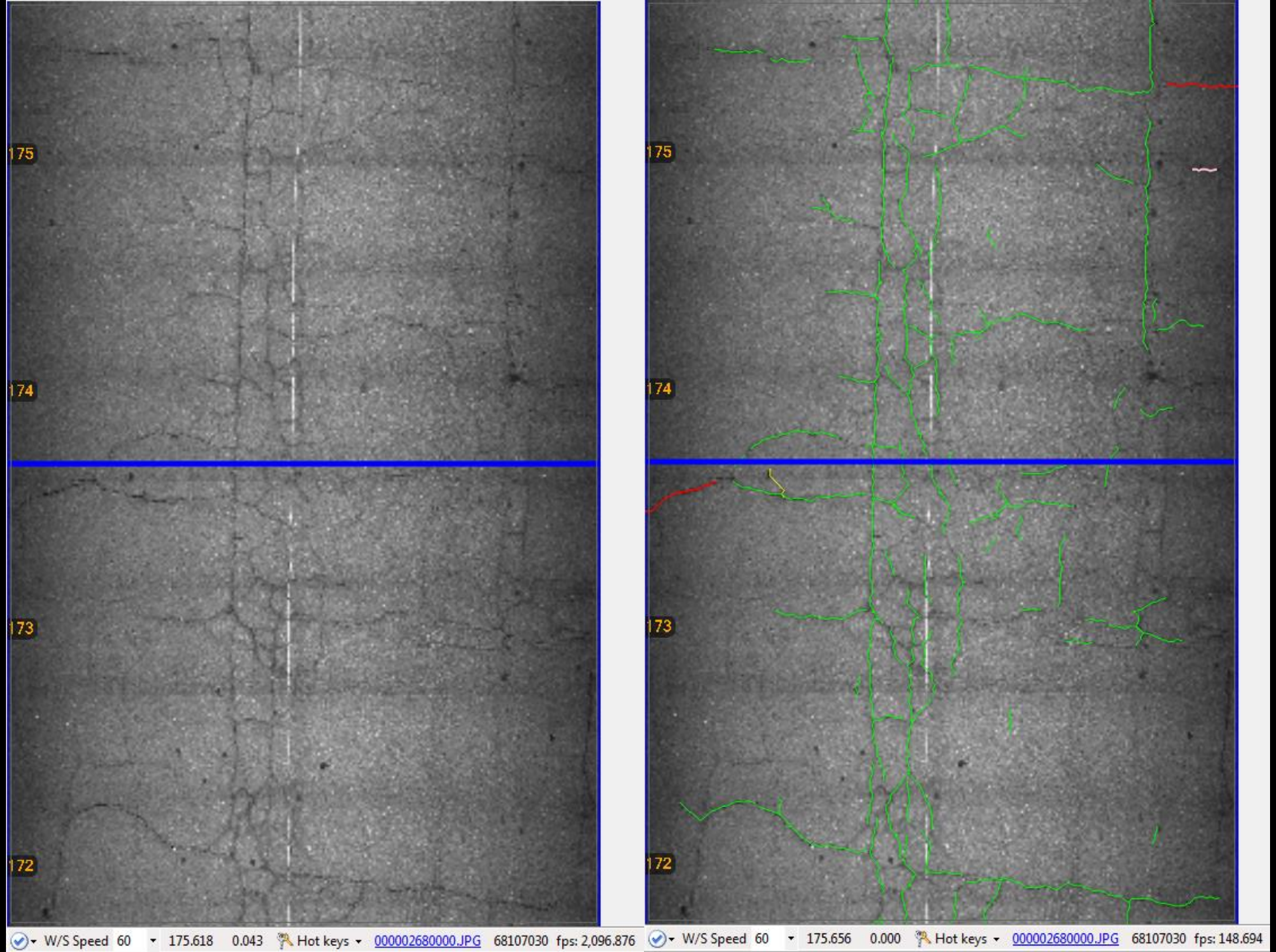
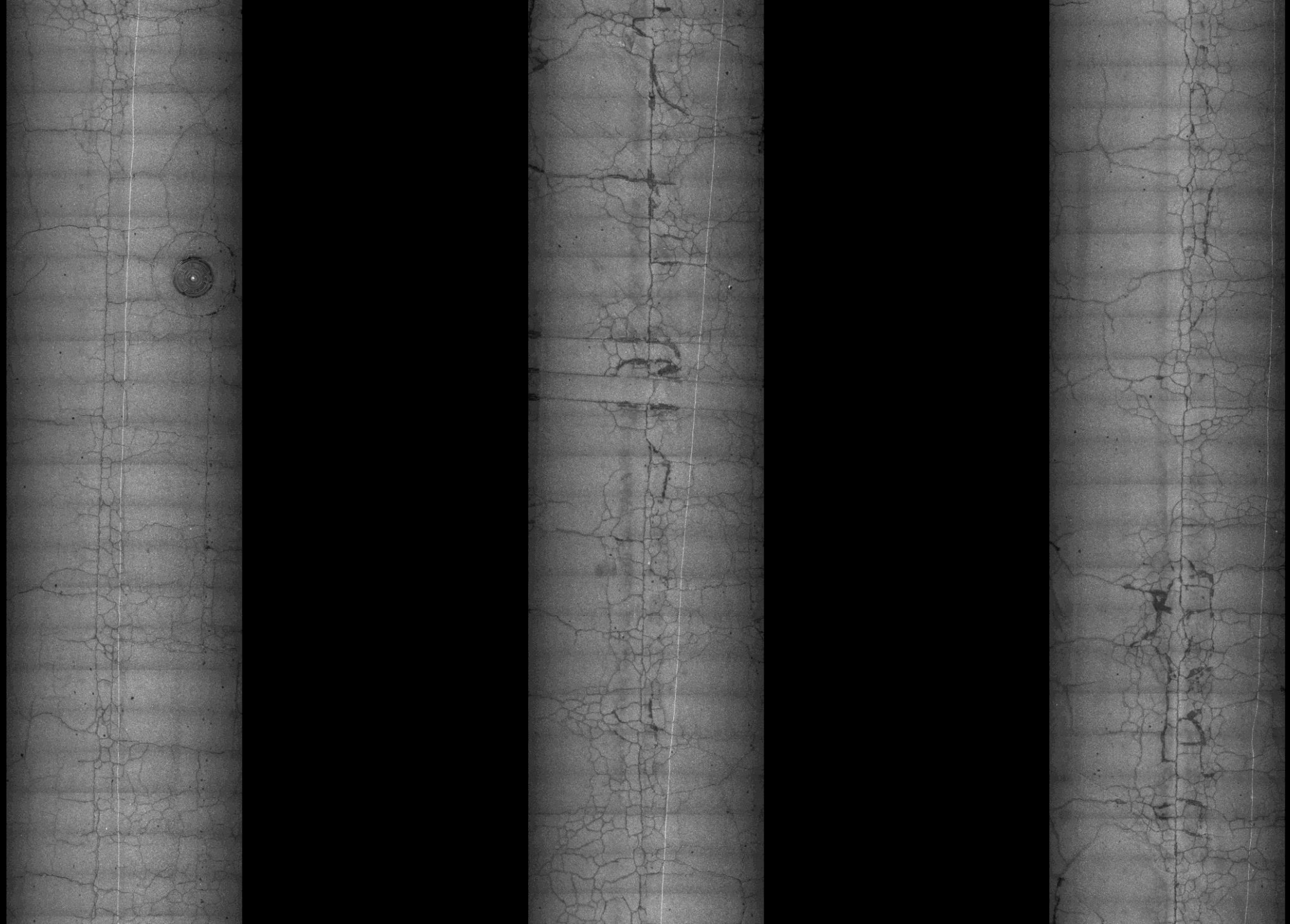
Magnify | Distresses | Cracks | Statistics



W/S Speed 60 175.618 0.043 Hot keys 000002680000.JPG 68107030 fps: 2,096.876

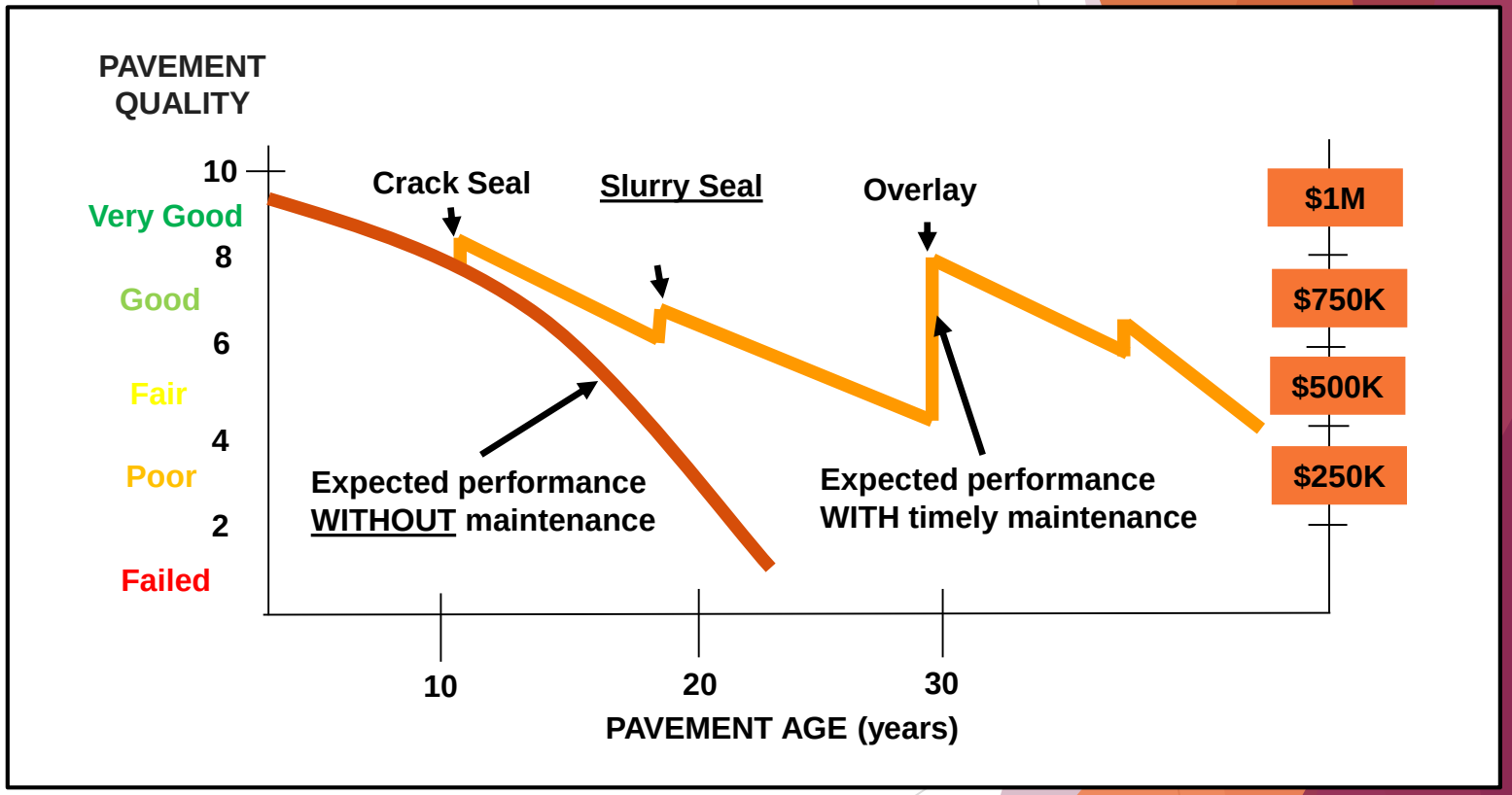
W/S Speed 60 175.656 0.000 Hot keys 000002680000.JPG 68107030 fps: 148.694



Pavement Management System

Data Analysis - dTIMS

- dTIMS - Deighton's Total Infrastructure Asset Management Solution
- Analyzes distress information from ARAN
- Performs cost/benefit optimization
- Provides final results
- Gives recommendations on maintenance schedule based on budget scenarios



Data Analysis

- Inputs
  - Roughness Index
  - Crack Indices

  Environmental

  Structural

  Pavement Condition Index (PCI)

  - Treatments; life & costs
  - Budgets
  - Traffic Volumes

  Cost/Benefit Optimization

- Outputs
  - Recommendations: treatment and timing

City of Pheonix - PCI Calculations

Section Length:	52.8
Section Width:	10

Section Test Area:	528

Distress	Maximum Extent in a 52.8 foot section
Alligator	528 Square Feet
Long WP	105.6 Linear Feet
Long Other	158.4 Linear Feet
Ravel / Weather	528 Square Feet
Roughness	Maximum IRI = 800

Extents

	Alligator	Long WP	Long Other	Transverse	Ravel / Weather	Roughness
Low	6.03	38	18.2	0.75	0	N
Moderate	0.014	0.38	0	0	0	
High	0	0	0	0	0	

Extents as a Percent

	Alligator	Long WP	Long Other	Transverse	Ravel / Weather
Low	1.14	35.984848	11.48989899	0.71	0.00
Moderate	0.00	0.3598485	0	0.00	0.00
High	0.00	0	0	0.00	0.00

158.4

Deduct Values

	Alligator	Long WP	Long Other	Transverse	Ravel / Weather
Low	1.21	22.92	1.35	0.07	0.00
Moderate	0.87	10.83	0.00	0.00	0.00
High	0.00	0.00	0.00	0.00	0.00

Distress Index Values

Index	97.92	66.25	98.65	99.93	100.00	100.00

Composite Indexes

Structural	82.09
Environmental	99.53
Roughness	100.00

Overall PCI

PCI	92.34

Cells in Blue are Input Fields
Cells in Green are Calculated Fields

Alligator Cracking

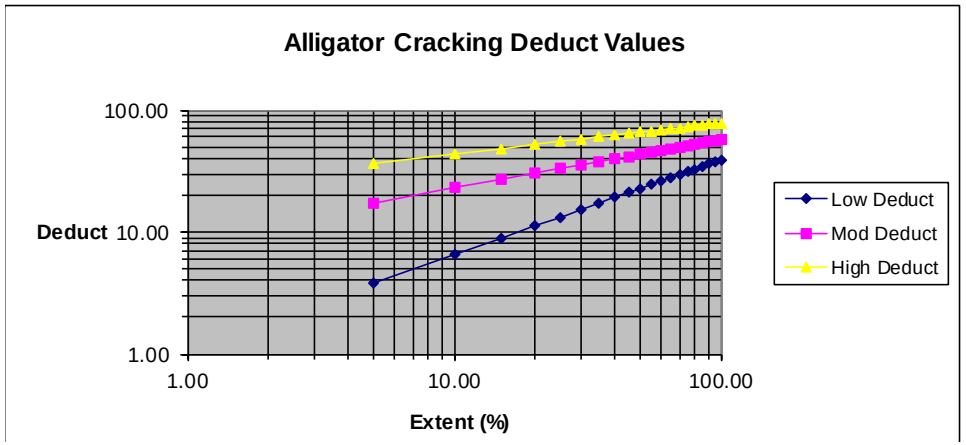
Input Fields: Low - Area of Low Severity Alligator Cracking
Mod - Area of Moderate Severity Alligator Cracking
High - Area of High Severity Alligator Cracking

Units Square Feet

Maximum Extent Area of the Section - 52.8 feet in length * 10 feet width - 528 square feet

Deduct Matrix

	Severity		
Extent %	Low Deduct	Mod Deduct	High Deduct
5.00	3.81	17.40	36.58
10.00	6.52	22.91	43.65
15.00	8.94	26.92	48.40
20.00	11.18	30.18	52.08
25.00	13.29	32.97	55.13
30.00	15.31	35.45	57.75
35.00	17.26	37.69	60.06
40.00	19.15	39.74	62.14
45.00	20.98	41.65	64.03
50.00	22.77	43.43	65.78
55.00	24.52	45.10	67.39
60.00	26.24	46.69	68.90
65.00	27.92	48.20	70.32
70.00	29.57	49.64	71.66
75.00	31.20	51.01	72.93
80.00	32.81	52.34	74.14
85.00	34.39	53.62	75.30
90.00	35.95	54.85	76.40
95.00	37.49	56.04	77.46
100.00	39.01	57.19	78.48

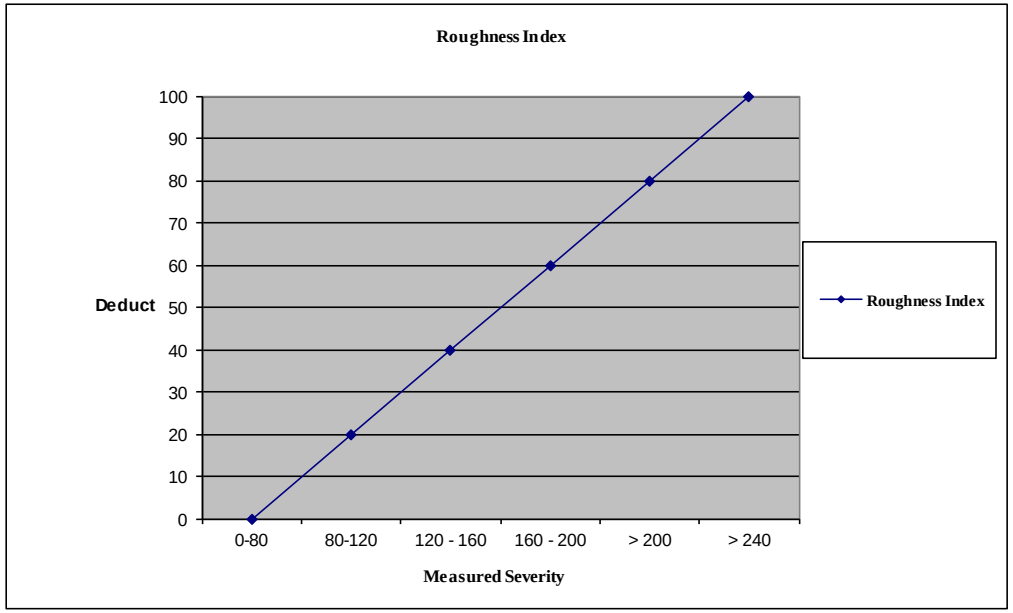


Roughness

Input Fields: IRI
Units inches / mile
Maximum Extent n/a

Deduct Matrix **Severity**

Severity	Roughness Index
0-80	0
80-120	20.00
120 - 160	40.00
160 - 200	60.00
> 200	80.00
> 240	100.00



Name	RoadName	Age	area	atb_from	atb_street	atb_to	council	Ind_Alligator	Ind_Environmental	Ind_IRI	Ind_Long_other	Ind_Long_wp	Ind_PCI	Ind_Ravel	Ind_Roughness	Ind_Roughness_2009	Ind_Structural	Ind_Transverse
SS015080	0000015085	11	330240	CAMPBELL AVE	19 AVE	CAMPBELL A	4	99.9821634200075	90.7315831846165	152.626777936824	88.3808686481721	88.4077739131107	86.1046350070975	100	78.1530064906017	70.6501693033241	94.1949686665572	93.0822977210608
SS015080	0000015090	11	330240	CAMPBELL AVE	19 AVE	CAMPBELL A	4	99.9821634200075	90.7315831846165	152.626777936824	88.3808686481721	88.4077739131107	86.1046350070975	100	78.1530064906017	70.6501693033241	94.1949686665572	93.0822977210608
SS015080	0000015095	11	330240	CAMPBELL AVE	19 AVE	CAMPBELL A	4	99.9821634200075	90.7315831846165	152.626777936824	88.3808686481721	88.4077739131107	86.1046350070975	100	78.1530064906017	70.6501693033241	94.1949686665572	93.0822977210608
SS015100	0000015100	28	347040	MISSOURI AVE	19 AVE	MISSOURI A	4	99.8464675374516	92.7611805790262	172.879615109391	90.2571762968466	84.4887382753663	82.6582129717939	99.9999999999999	69.0742759176022	65.3514721617277	92.167602906409	95.2651848612059
SS015100	0000015110	28	347040	MISSOURI AVE	19 AVE	MISSOURI A	4	99.8464675374516	92.7611805790262	172.879615109391	90.2571762968466	84.4887382753663	82.6582129717939	99.9999999999999	69.0742759176022	65.3514721617277	92.167602906409	95.2651848612059
SS015100	0000015115	28	347040	MISSOURI AVE	19 AVE	MISSOURI A	4	99.8464675374516	92.7611805790262	172.879615109391	90.2571762968466	84.4887382753663	82.6582129717939	99.9999999999999	69.0742759176022	65.3514721617277	92.167602906409	95.2651848612059
SS015140	0000015150	18	326720	ORANGEWOOD AVE	19 AVE	ORANGEWOOD	5	99.9724197708906	75.9455645249907	375.820696783074	63.9464307587647	79.8517851317138	57.1167492881291	99.9999999999999	19.7500430708255	55.0784794276239	89.9121024513022	87.9446982912167
SS015140	0000015155	18	326720	ORANGEWOOD AVE	19 AVE	ORANGEWOOD	5	99.9724197708906	75.9455645249907	375.820696783074	63.9464307587647	79.8517851317138	57.1167492881291	99.9999999999999	19.7500430708255	55.0784794276239	89.9121024513022	87.9446982912167
SS015160	0000015160	15	330560	BUTLER DR	19 AVE	BUTLER DR	4.0109836764237373	99.9617261417686	83.3707743045108	291.892133982447	77.0428138259332	84.100479772046	68.2705477763512	99.9999999999999	40.2763012043615	53.6762152812203	92.0311029569073	89.6987347830884
SS015180	0000015190	10	323840	MOUNTAIN VIEW RD	19 AVE	MOUNTAIN V	3	99.9733558609873	76.7612293587828	192.073553644072	79.7144026937344	80.8440732769306	72.5592278719354	100	58.6805651171208	55.3944003309649	90.4087145689589	73.8080560238313
SS015180	0000015195	10	323840	MOUNTAIN VIEW RD	19 AVE	MOUNTAIN V	3	99.9733558609873	76.7612293587828	192.073553644072	79.7144026937344	80.8440732769306	72.5592278719354	100	58.6805651171208	55.3944003309649	90.4087145689589	73.8080560238313
SS015180	0000015205	10	323840	MOUNTAIN VIEW RD	19 AVE	MOUNTAIN V	3	99.9733558609873	76.7612293587828	192.073553644072	79.7144026937344	80.8440732769306	72.5592278719354	100	58.6805651171208	55.3944003309649	90.4087145689589	73.8080560238313
SS015250	0000015250	2	332480	GREENWAY RD	19 AVE	GREENWAY R	3	99.8909999440026	94.5257963955969	122.564285477198	92.6857988441293	78.2067255672925	88.6634342902367	99.9999999999998	86.3036963267487	53.9528683822284	89.0488627556593	96.3657939470646

dTIMS 9.5 For Windows

Home | Map Tools | Accelerators | System Tools

Current Objects: Budget Scenarios | Refresh | Select All | Filter | Showing 30 of 30 Records
Content

New | Edit | Save All Changes | Clear Changes | Delete | Dependencies
Editing

Temporal
Temporal LRM

Paste | Copy
Clipboard

Run
Action

Import | Export | Remove all elements | Reorder pieces | Missing pieces | Compare Networks
Data

Status | Online Resources | dTIMS Help

My dTIMS Objects

- Network & Data
- Table Hierarchy
- Database Management
- Strategic Management
  - Analysis Expressions
  - Analysis Sets
  - Analysis Variables
  - Budget Scenarios
  - Cross Asset Analysis
  - dFRAG Expressions
  - dFRAG Objects
  - SAM
  - Treatments
- All
- Other

Filter: Filter My dTIMS Objects

Map | Table | Stripmap | Charts/Reports | Hierarchy

Average Condition
Length In Backlog
Condition Distribution
Travel Distribution
Treatment Costs
Treatment Lengths
Program Costs
SAM Results
Review & Adjust
Construction Program

Select Strategy | Reset Strategy | Reset All Strategies | Add a Strategy | Modifications Report | Export Strategies | Import Strategies

Elements

Drag a column header and drop it here to group by that column

RoadName	From	From_Description	To	To_Description	Name
0000033070	0.000000		1478.000000		SS033070
0000033080	0.000000		1214.000000		SS033070
0000033090	0.000000		1161.000000		SS033090
0000033100	0.000000		1372.000000		SS033090

Strategies

Drag a column header and drop it here to group by that column

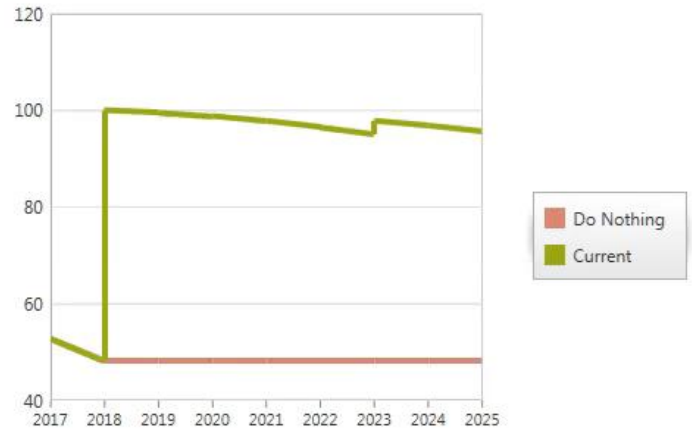
Year	1st Major	Benefit / Cost	PV Benefits	PV Cost	IBC	Base
			0	$0.00	0	
2018	Overlay	0.187476401	28197.3137209317	$150,404.60	0.187476401	
2018	Overlay	0.186979995	28095.2841801279	$150,258.24	0.186979995	
2018	Overlay	0.186389635	27979.8210245168	$150,114.68	0.186389635	

Strategy Treatments | Original Strategy Treatments | Budgets

NYEAR	Treatment	Type	Budget Category	Financial Cost	Economic Cost
2018	Overlay	Major	Overlay	$154,445.45	$2.00
2023	Crack_Seal	Major	Crackseal	$10,015.69	$2.00

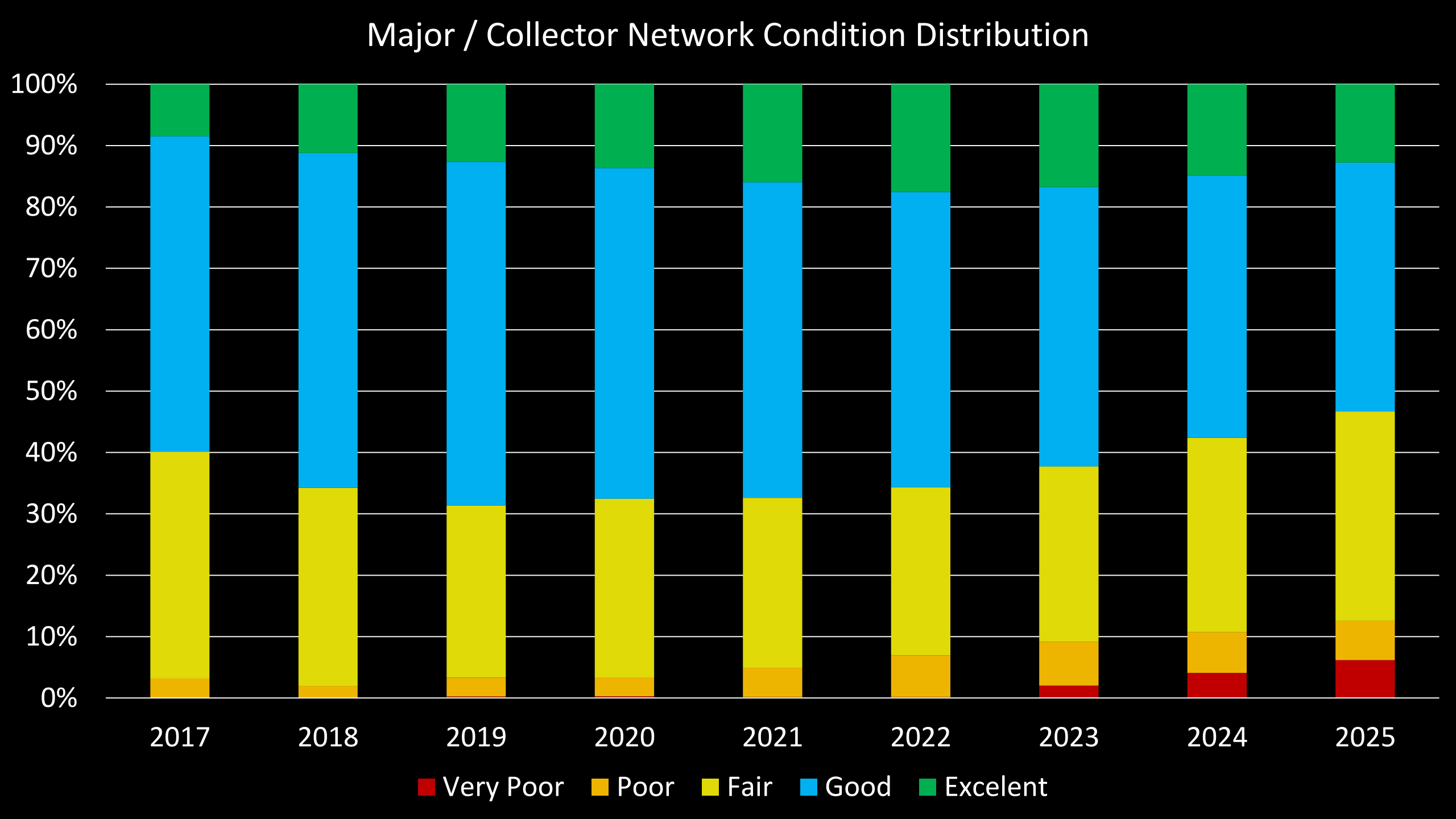
Efficiency Chart | Analysis Variables | Analysis Variables Chart | Strategies Chart | Budget Chart

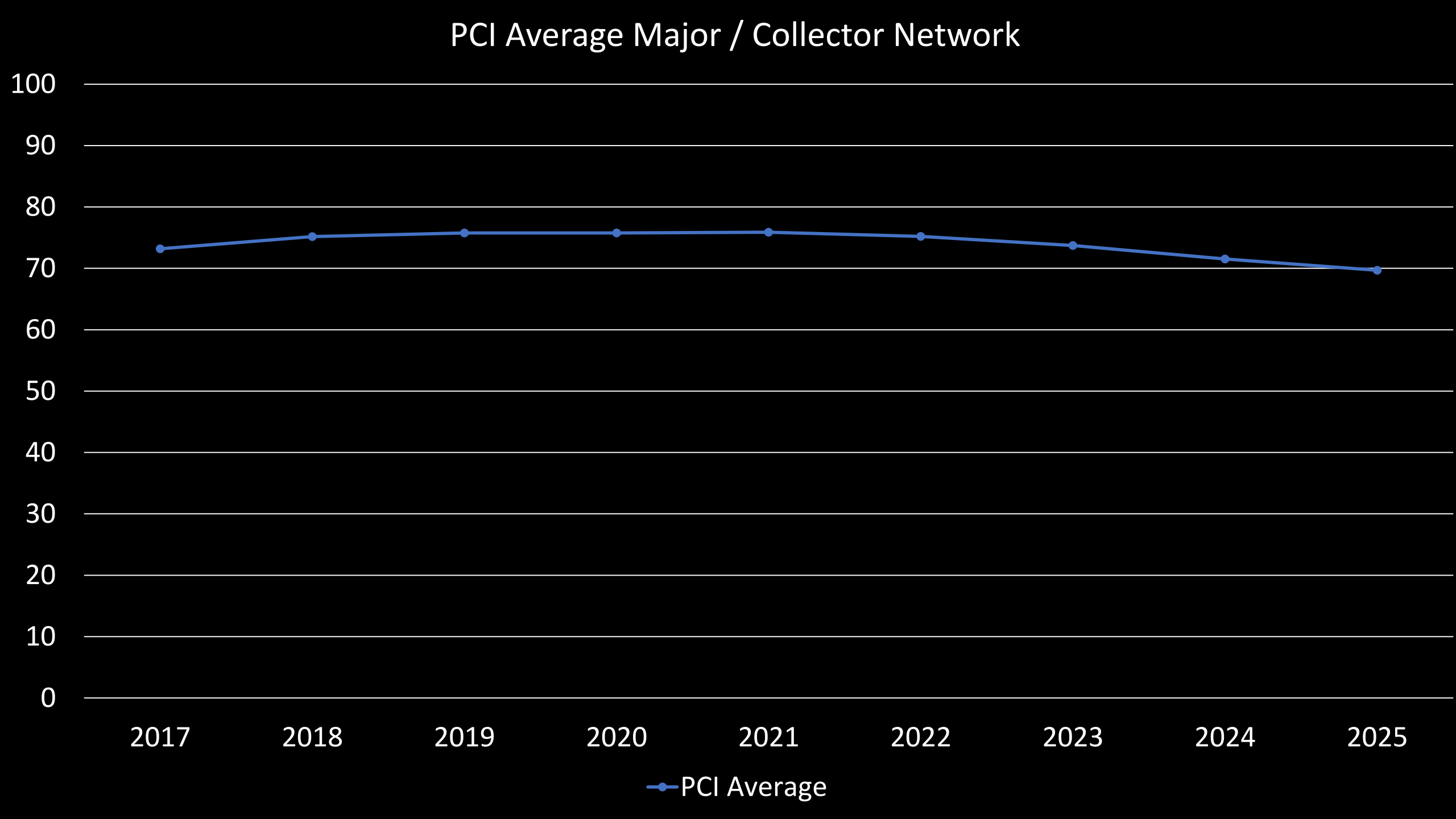
Analysis Variable: nAAV_CND_PCI



View Chart Data

Object View


Major / Collector Network Condition Distribution
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2017
2018
2019
2020
2021
2022
2023
2024
2025
Very Poor
Poor
Fair
Good
Excelent


PCI Average Major / Collector Network
100
90
80
70
60
50
40
30
20
10
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
PCI Average

dTIMS 9.5 For Windows

Home | Map Tools | Accelerators | System Tools

Current Objects: Budget Scenarios | Refresh | Select All | Filter | Showing 30 of 30 Records
Content: New | Edit | Save All Changes | Clear Changes | Delete | Dependencies
Editing: Temporal
Temporal LRM: Paste | Copy
Clipboard: Run
Action: Import | Export | Remove all elements | Reorder pieces | Missing pieces | Compare Networks
Data: Status | Online Resources | dTIMS Help

My dTIMS Objects

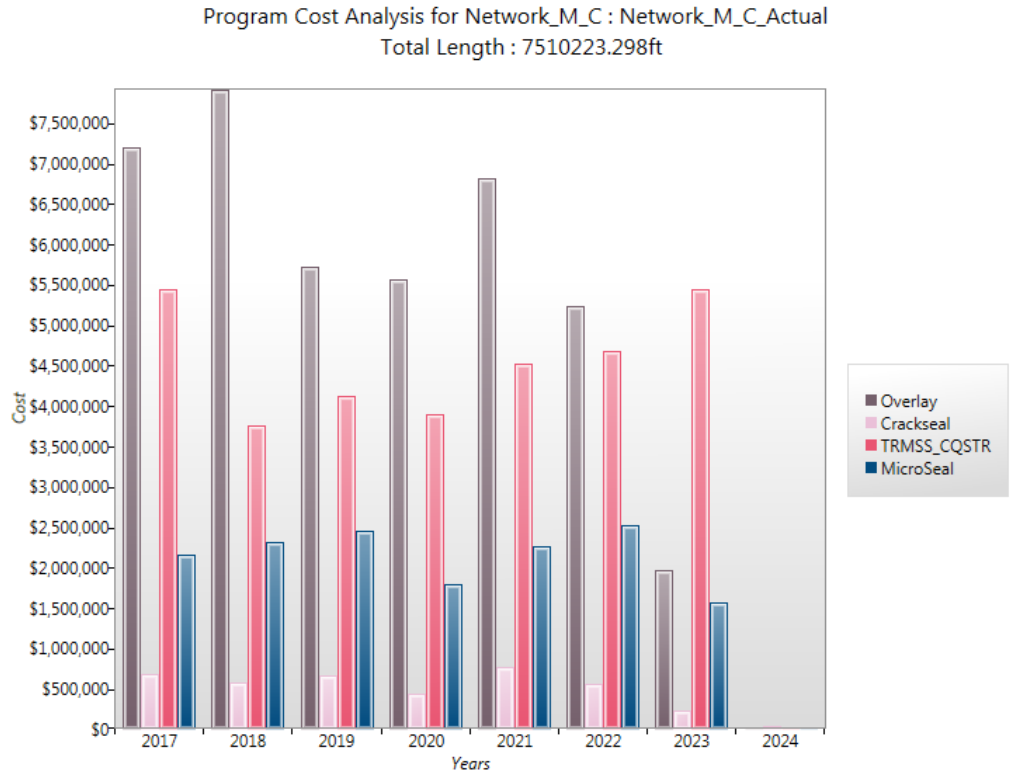
- PMS_AIRPORT_REPORT
- PMS_COM_TRT
- PMS_CONDITION_ALLIGATOR
- PMS_CONDITION_LONG_OT
- PMS_CONDITION_LONG_WP
- PMS_CONDITION_PCI
- PMS_CONDITION_RAVEL
- PMS_CONDITION_Roughness
- PMS_CONDITION_TRANSVERS
- PMS_INDEX_RESET
- PMS_OUTPUT_REPORT
- PMS_R_I_CONSTRUCTION_PRC
- PMS_REHAB_FIELDS
- PQ_MISSING_ARAN_DATA

Table Hierarchy
Database Management
Strategic Management
- Analysis Expressions
- Analysis Sets
- Analysis Variables
- Budget Scenarios
- Cross Asset Analysis
- dFRAG Expressions
- dFRAG Objects
- SAM

Filter: Filter My dTIMS Objects

Map | Table | Stripmap | Charts/Reports | Hierarchy

Average Condition
Length In Backlog
Condition Distribution
Travel Distribution
Treatment Costs
Treatment Lengths
Program Costs
SAM Results
Review & Adjust
Construction Program



Apply Changes
Save Chart | Copy Chart

Chart Options <no name>
Search
Chart Options
Filter: (None)

View Chart Data

Object View

Selected Item: Network_M_C_Actual | Current LRM Date: September 27, 2017

Funding

Pavement Maintenance Funding

Transportation 2050 (T2050)

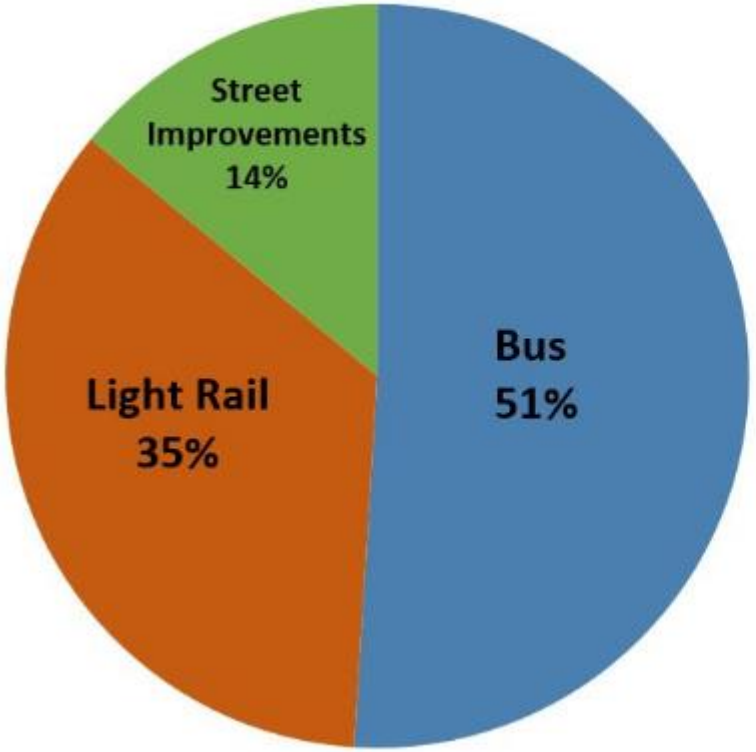
- Sales tax in City of Phoenix
  - 0.7% sales tax
  - 70 cents on $100 purchase
- Approved by Phoenix residents in August 2015
- Focus on arterial streets
- $16.7 billion over the 35-year life of the plan

Arizona Highway User Revenue Fund (AHUR/ HURF)

- Gas tax distribution
- Used for all other streets

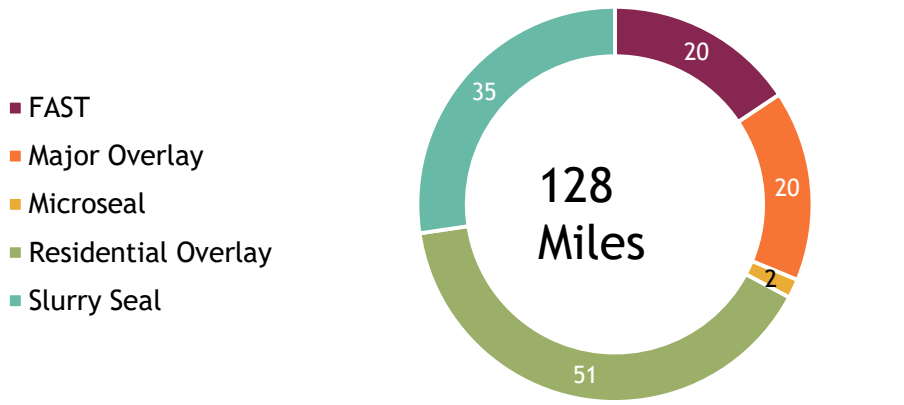
Currently, T2050 is funding approx. $14M worth of projects per year. AHUR funds about $35M per year.

$16.7 Billion Distribution Breakdown

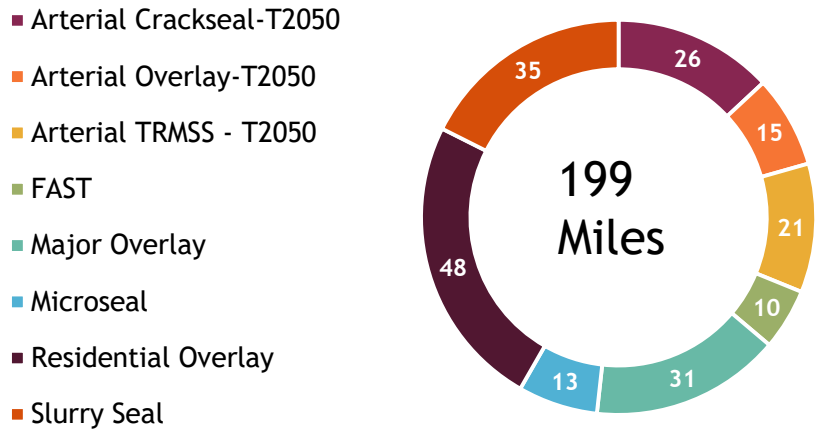


Street Improvement Program Allocations

2014 Resurfacing

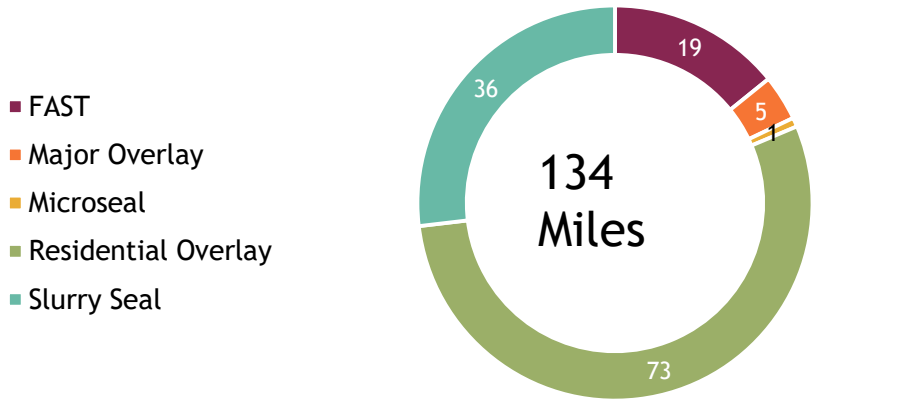


2016 Resurfacing

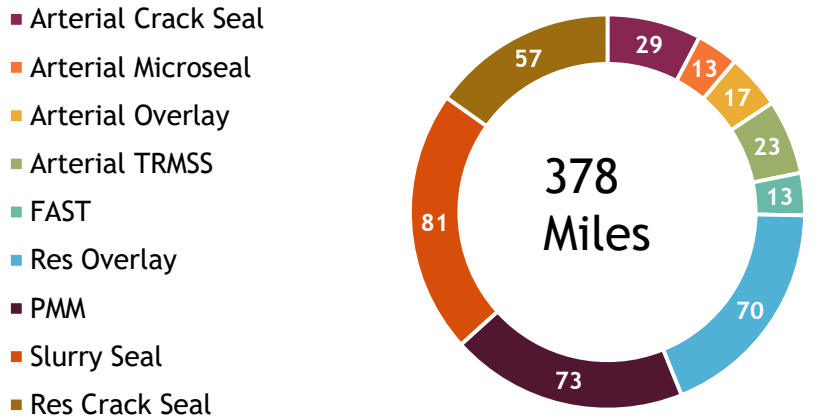


Partial Implementation

2015 Resurfacing



2017 Resurfacing

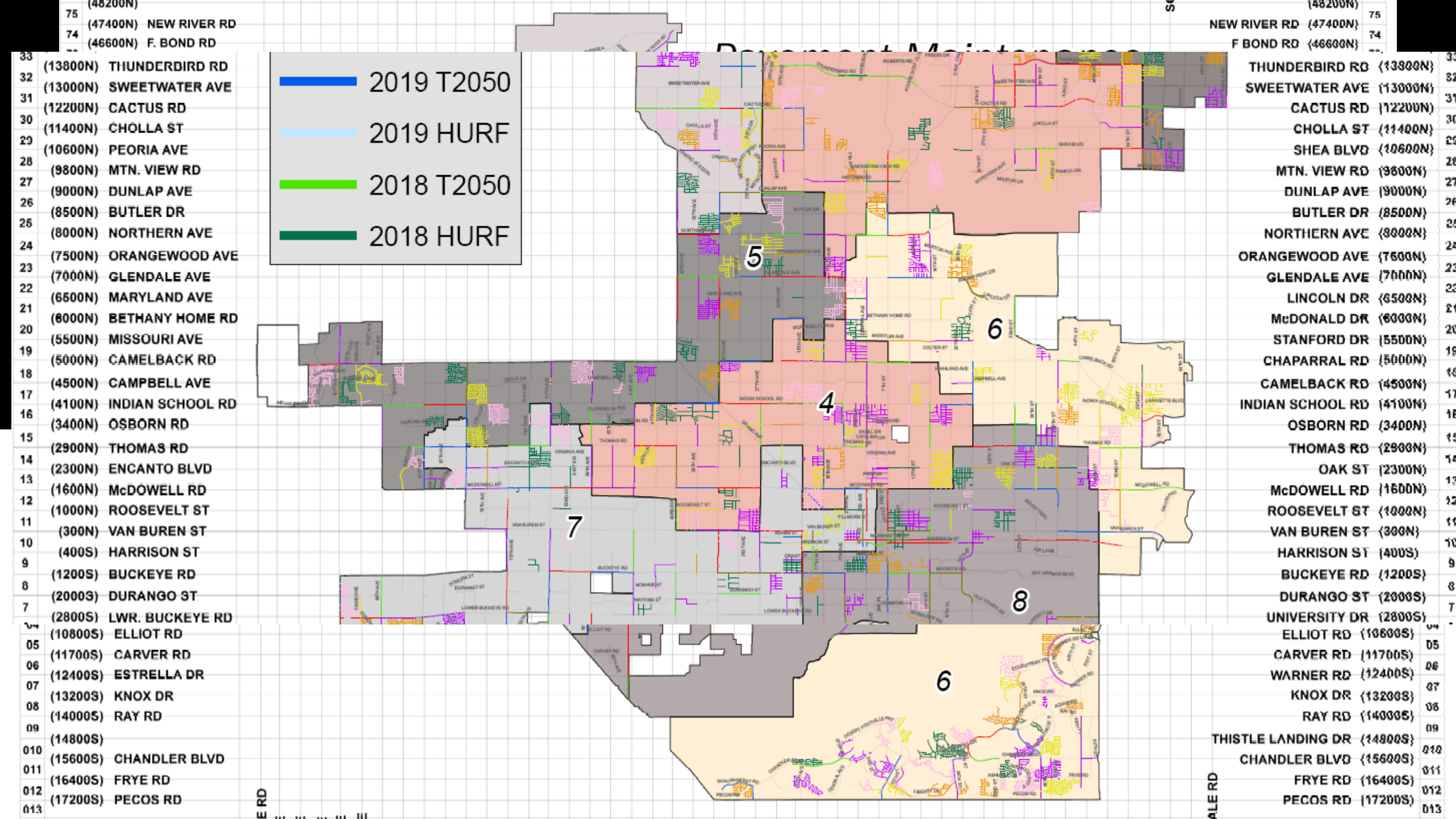


Full Implementation

Implementation

Implementation of the PMP

- Results from the Pavement Management System are reviewed by City staff
- Field visits are conducted to determine if we agree with the recommendation of the system
- Develop the 5-year Pavement Maintenance Program
  - Coordinate with other City departments and outside entities to avoid construction conflicts
  - Presentations and review
  - Check revisions to budget estimates
  - Feedback into PMS


2019 T2050
2019 HURF
2018 T2050
2018 HURF
5
6
4
7
8
6
(48200N) NEW RIVER RD
(47400N) F. BOND RD
(46600N)
(13800N) THUNDERBIRD RD
(13000N) SWEETWATER AVE
(12200N) CACTUS RD
(11400N) CHOLLA ST
(10600N) PEORIA AVE
(9800N) MTN. VIEW RD
(9000N) DUNLAP AVE
(8500N) BUTLER DR
(8000N) NORTHERN AVE
(7500N) ORANGEWOOD AVE
(7000N) GLENDALE AVE
(6500N) MARYLAND AVE
(6000N) BETHANY HOME RD
(5500N) MISSOURI AVE
(5000N) CAMELBACK RD
(4500N) CAMPBELL AVE
(4100N) INDIAN SCHOOL RD
(3400N) OSBORN RD
(2900N) THOMAS RD
(2300N) ENCANTO BLVD
(1600N) McDOWELL RD
(1000N) ROOSEVELT ST
(300N) VAN BUREN ST
(400S) HARRISON ST
(1200S) BUCKEYE RD
(2000S) DURANGO ST
(2800S) LWR. BUCKEYE RD
(10800S) ELLIOT RD
(11700S) CARVER RD
(12400S) ESTRELLA DR
(13200S) KNOX DR
(14000S) RAY RD
(14800S)
(15600S) CHANDLER BLVD
(16400S) FRYE RD
(17200S) PECOS RD
THUNDERBIRD RD (13800N)
SWEETWATER AVE (13000N)
CACTUS RD (12200N)
CHOLLA ST (11400N)
SHEA BLVD (10600N)
MTN. VIEW RD (9800N)
DUNLAP AVE (9000N)
BUTLER DR (8500N)
NORTHERN AVE (8000N)
ORANGEWOOD AVE (7500N)
GLENDALE AVE (7000N)
LINCOLN DR (6500N)
McDONALD DR (6000N)
STANFORD DR (5500N)
CHAPARRAL RD (5000N)
CAMELBACK RD (4500N)
INDIAN SCHOOL RD (4100N)
OSBORN RD (3400N)
THOMAS RD (2900N)
OAK ST (2300N)
McDOWELL RD (1600N)
ROOSEVELT ST (1000N)
VAN BUREN ST (300N)
HARRISON ST (400S)
BUCKEYE RD (1200S)
DURANGO ST (2000S)
UNIVERSITY DR (2800S)
ELLIOT RD (10800S)
CARVER RD (11700S)
WARNER RD (12400S)
KNOX DR (13200S)
RAY RD (14000S)
THISTLE LANDING DR (14800S)
CHANDLER BLVD (15600S)
FRYE RD (16400S)
PECOS RD (17200S)

Budget & Planned Miles for T2050 and AHUR Projects	Fiscal Year				
	2018	2019	2020	2021	2022
Budget (Millions of Dollars)					
T2050	$14.8	$15.5	$16.3	$17.1	$17.4
AHUR	$26.3	$26.4	$31.6	$31.6	$33.3
Total	$41.1	$41.9	$47.9	$48.7	$50.7
Planned Miles					
T2050	70.70	68.91	69.59	73.15	74.13
AHUR	216.61	211.14	243.80	244.17	229.47
Total	287.31	208.05	313.39	317.32	303.6

Going Forward

- ARAN upgrade to ARAN 9000 – End of October 2017
  - 3D Pave Technology will allow for better crack detection, using depth differential to detect cracks.
  - Microtexture for roughness
  - Transverse profile
  - Detection of raveling and potholes
- 100% data collection of residential streets
- Use the last 10 years of data to validate and improve condition forecasting models in the PMS

City of Phoenix Pavement Management System

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Civil Engineer III

City of Phoenix Street Transportation Department

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