



Cartegraph[™]
A New Way to Look at Government.

Pavement Management using GIS and Cartegraph

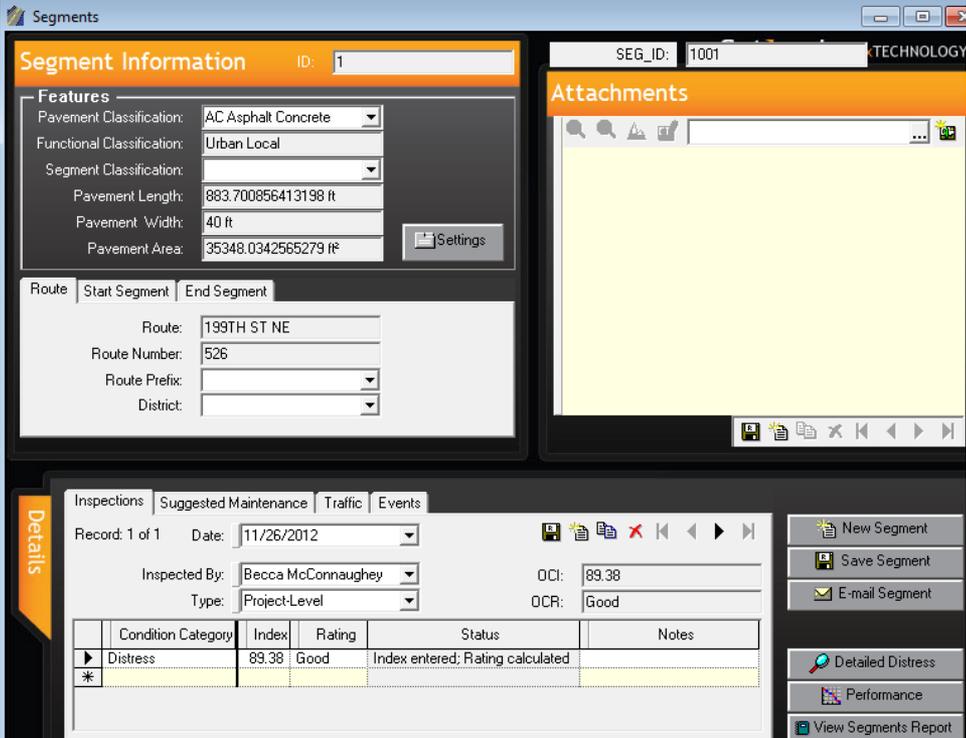
A Case Study

Katie Heim
GIS Coordinator
City of Arlington



Overview

- Arlington
- Need for a program
- Analysis of street condition survey
- Formation of TBD
- 2014 street preservation plan



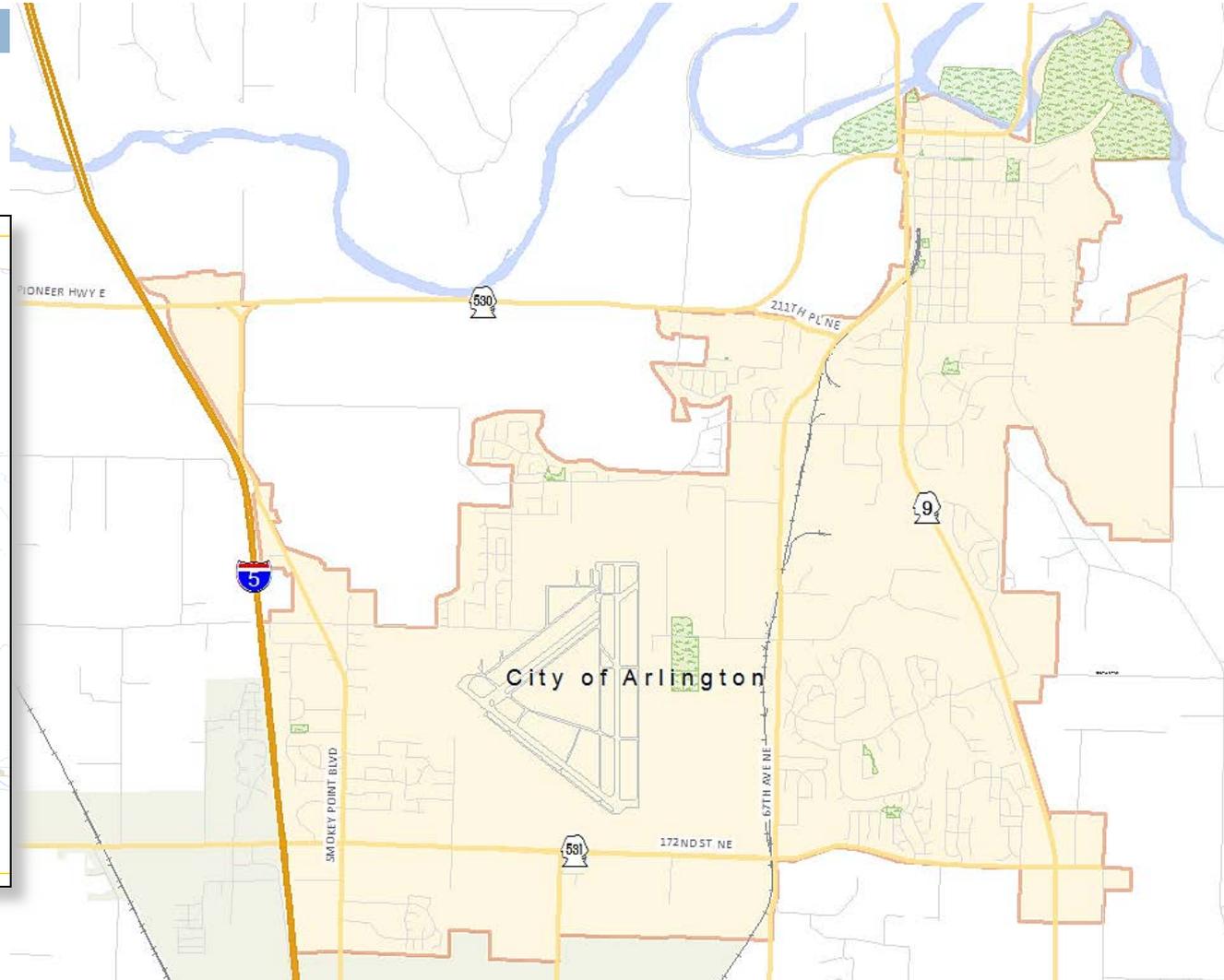
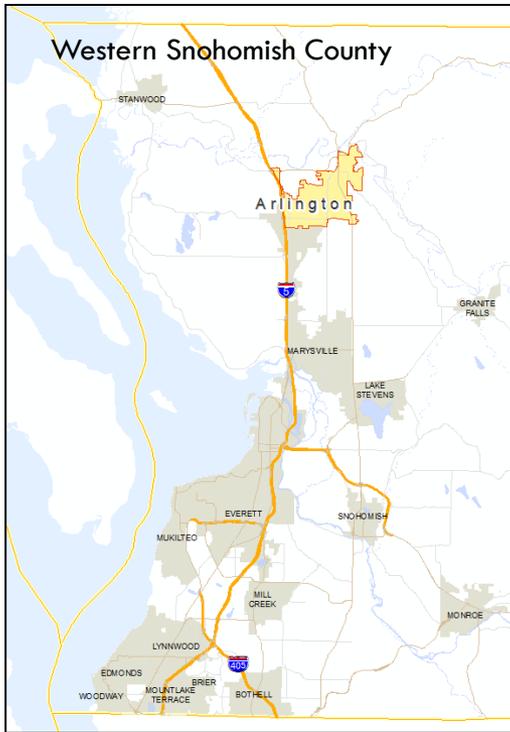
The screenshot displays the 'Segments' application window. The main area is divided into several sections:

- Segment Information:** ID: 1. Features include Pavement Classification (AC Asphalt Concrete), Functional Classification (Urban Local), Segment Classification, Pavement Length (883.700856413198 ft), Pavement Width (40 ft), and Pavement Area (35348.0342565279 ft²).
- Route:** Start Segment, End Segment, Route (199TH ST NE), Route Number (526), Route Prefix, and District.
- Attachments:** A large empty area for uploading files.
- Details:** Includes tabs for Inspections, Suggested Maintenance, Traffic, and Events. The 'Inspections' tab is active, showing Record 1 of 1, Date (11/26/2012), Inspected By (Becca McConnaughey), Type (Project-Level), OCI (89.38), and OCR (Good).
- Table:** A table with columns for Condition Category, Index, Rating, Status, and Notes. The first row shows 'Distress' with an Index of 89.38 and a Rating of 'Good'.
- Right Panel:** A vertical toolbar with buttons for 'New Segment', 'Save Segment', 'E-mail Segment', 'Detailed Distress', 'Performance', and 'View Segments Report'.

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City of Arlington



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□ Rural home-town feel



□ Industrial base



Why Pavement Management



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- Citizens, Visitors, Businesses
- Transportation
 - ▣ Lack of funding
 - ▣ Federal/State funds
- Planning



Pavement Management Plan Process



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□ Decisions



□ What?

- Streets

- Distresses

□ Who?

- Street Rating

□ How?

- Software

□ When?

- Timeframe

Pavement Management Plan Process



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- Selected consultant
 - VPR Services LLC out of Spokane, WA



- Streets
- Distresses
- Software
- Timeframe

The Seven Distresses



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□ Edge Cracking



□ Linear Cracking

The Seven Distresses cont...



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□ Patching



□ Rutting

The Seven Distresses cont...



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□ Raveling & Weathering



The Seven Distresses cont...

□ Bumps & Sags



The Seven Distresses cont...



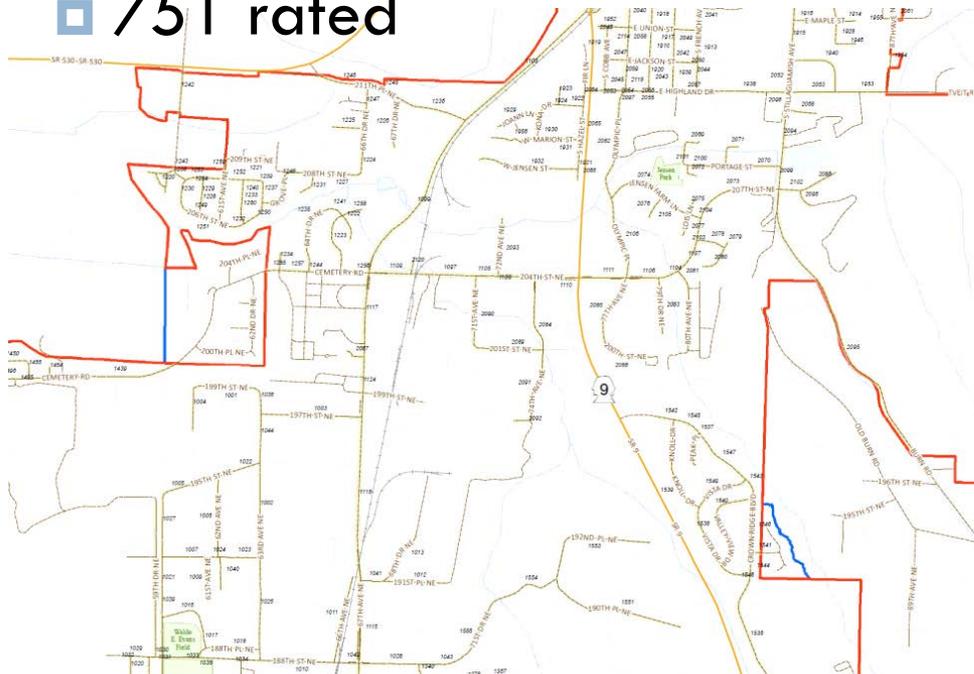
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□ Fatigue Cracking



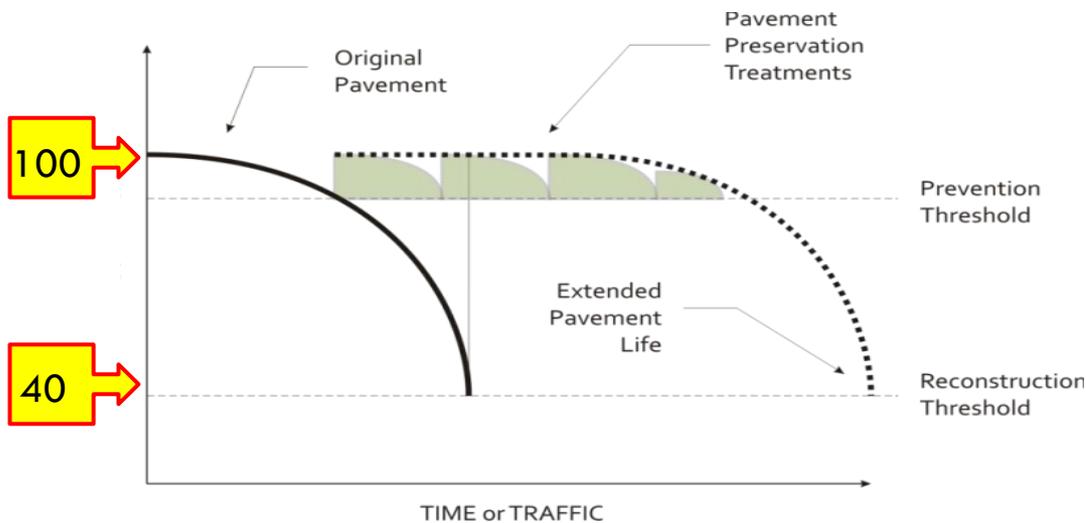
GIS Setup

- 87 miles of street centerlines
- 793 segments
 - ▣ 42 not rated
 - ▣ 751 rated
- Segment attributes
 - ▣ Unique ID
 - ▣ Width
 - ▣ Length
 - ▣ Start/End
 - ▣ Distresses
 - ▣ PCI Rating



Importance of PCI

- The PCI
- Importance for pavement management



Pavement Condition Rating (PCR)	Pavement Condition Index (PCI)
Good	85 - 100
Satisfactory	70 - 85
Fair	60 - 70
Poor	40 - 60
Reconstruct	0 - 40



Importance of PCI

- PCI calculated by deduct values

- Distress (x)

- Severity (y)

$$PCI = 100 - (x) - (y) *$$

* *Very simplified equation*

- PCI vs. OCI

Pavement Condition Rating (PCR)	Pavement Condition Index (PCI)
Good	85 - 100
Satisfactory	70 - 85
Fair	60 - 70
Poor	40 - 60
Reconstruct	0 - 40



Import Ratings to Cartegraph

- 3,331 distresses found
- Import to Cartegraph
- Review results

Date Rated	SEG_ID	NAME	DistressName	Severity	Extent	Measure 1
11/26/2012	1001	199TH ST NE	AC Bumps & Sags	Low	0.01	5
11/26/2012	1001	199TH ST NE	AC Linear Cracking (trans/long)	Low	0.26	91
11/26/2012	1001	199TH ST NE	AC Patching	Low	5.43	1920
11/26/2012	1002	63RD AVE NE	AC Edge Cracking	Low	0.02	5
11/26/2012	1002	63RD AVE NE	AC Fatigue (alligator) Cracking	Low	0.34	110
11/26/2012	1002	63RD AVE NE	AC Fatigue (alligator) Cracking	High	0.44	140
11/26/2012	1002	63RD AVE NE	AC Fatigue (alligator) Cracking	Moderate	5.77	1845
11/26/2012	1002	63RD AVE NE	AC Linear Cracking (trans/long)	Moderate	0.06	20
11/26/2012	1002	63RD AVE NE	AC Linear Cracking (trans/long)	Low	0.63	200
11/26/2012	1002	63RD AVE NE	AC Patching	Low	0.22	70
11/26/2012	1002	63RD AVE NE	AC Raveling & Weathering	Low	9.94	3176
11/26/2012	1003	197TH ST NE	AC Edge Cracking	Low	0.06	20

Analyzing Results



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□ Issues

- Import
- Calibration
- PCI/OCI



Analyzing the Results cont.

- PCI not calculating correctly
 - ▣ Alter weights
 - ▣ Hot fix



Segment Condition Categories

Datasheet View

	Condition Category	Weight
▶	Distress	8
	Geometrics	0
	Ride	0
	Rutting	0
	Safety	0
	Service	0
	Structure	0
	Surface Friction	0
*		

Condition (PCI) Rating



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Inspection

Record: 1 of 1 Date: 11/02/2012

Condition: **Detailed Distress** | Suggested Maintenance | Notes

Add Previous Samples Add Single Sample Add USACERL Samples

Distress Samples

ID	Area	Index	Length	Location	Notes	Type
2016	9078.15136	48.68	349.159668			Random
*						

Distresses

Distress	Extent	Index	Measure 1	Measure 2	Severity
AC Bumps & Sags	0.11	1.07	10		Low
AC Fatigue (alligator) Cra	3.8	22.4	345		Low
AC Fatigue (alligator) Cra	6.61	40.9	600		Moderate
AC Fatigue (alligator) Cra	0.07	8.4	6		High
AC Linear Cracking (tran	0.06	2.4	5		High
AC Linear Cracking (tran	1.92	3.84	174		Low
AC Linear Cracking (tran	0.17	0.7	15		Moderate
AC Patching	0.01	0.3	1		Moderate
*					



Condition (PCI) Rating cont.

Pavement Condition Rating (PCR)	Pavement Condition Index (PCI)
Good	85 - 100
Satisfactory	70 - 85
Fair	60 - 70
Poor	40 - 60
Reconstruct	0 - 40

Inspection

Record: 1 of 1 Date: 11/02/2012

Condition | Detailed Distress | Suggested Maintenance | Notes

Inspected By: Becca McConnaughey
Reviewed By:
Type: Project-Level

OCI: 48.68
OCR: Poor

Inspection Types

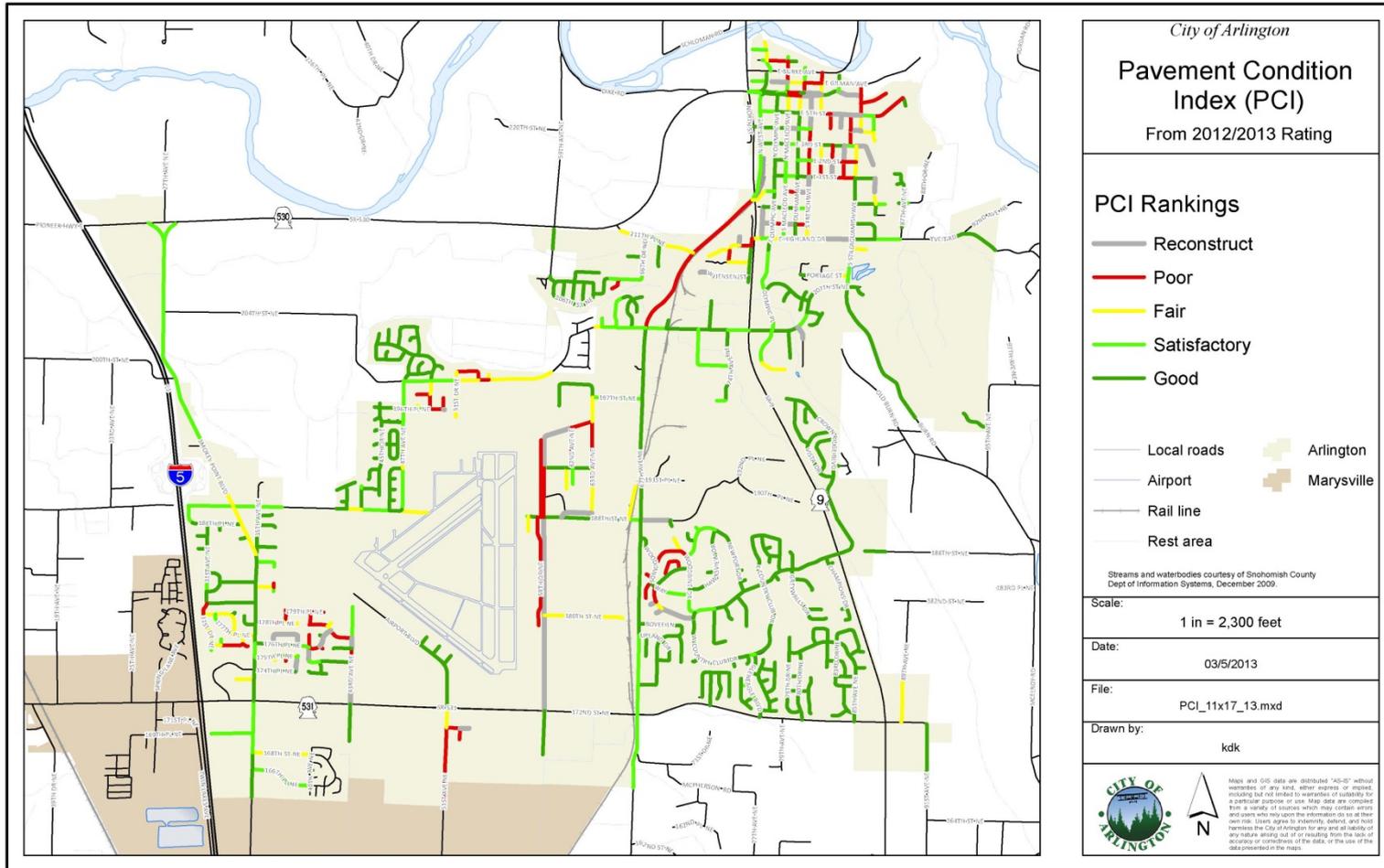
Condition Category	Index	Rating	Status	Notes
▶ Distress	48.68	Poor	Index entered; Rating calculated	
*				



Condition (PCI) Rating cont.



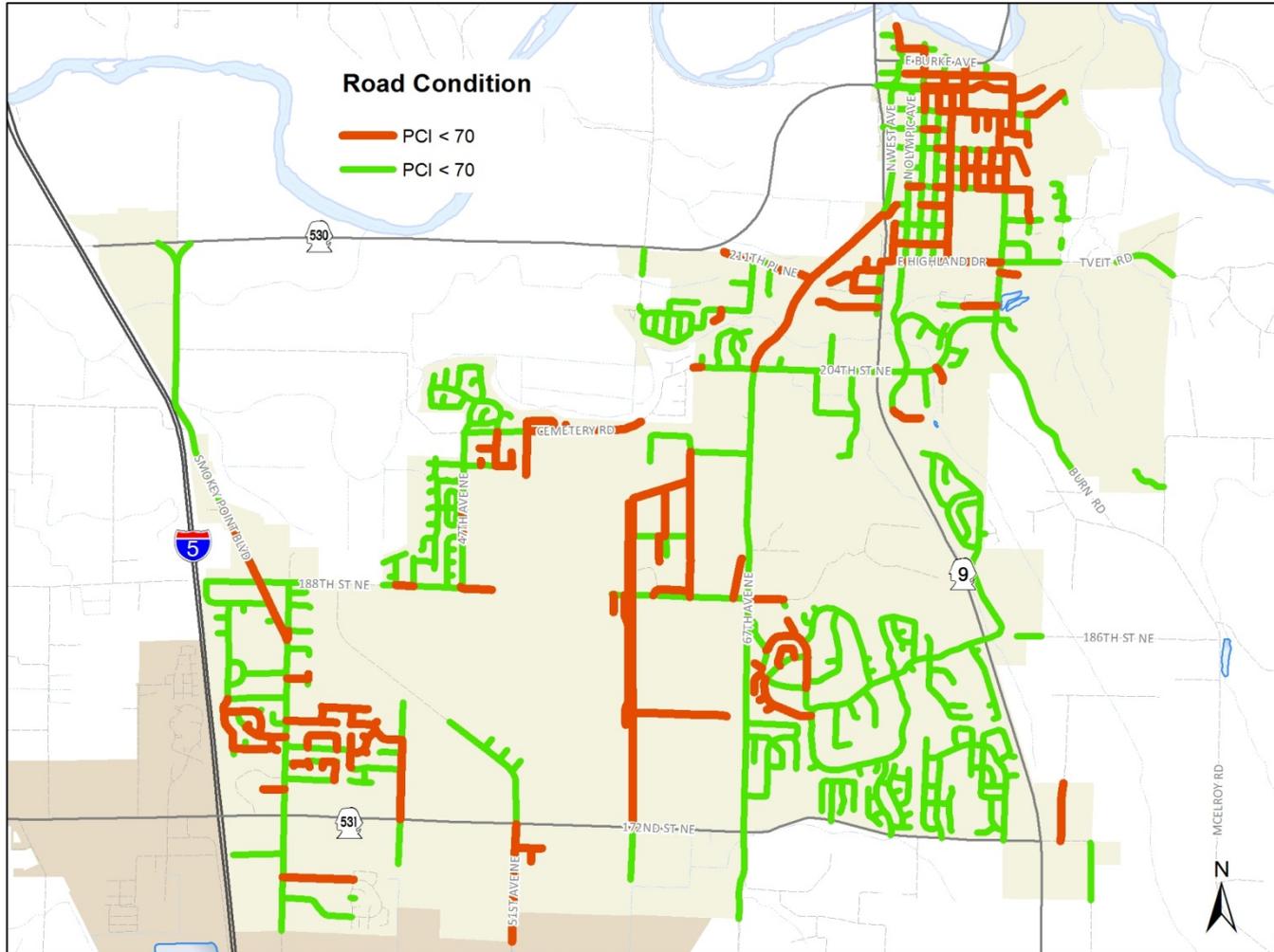
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Condition (PCI) Rating cont.



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Managing Pavement Begins

- Reconstruction vs preservation
- PCI vs Functional Classification
 - ▣ Arterial, Collector, Local
- Who makes decisions
 - ▣ Projects
 - ▣ Priority
 - ▣ Funding



Transportation Benefit District Board



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- ❑ The TBD, that's who!
- ❑ Set goals
- ❑ Make decisions
- ❑ Allocate funds

ORDINANCE NO. 2013-005

AN ORDINANCE OF THE CITY OF ARLINGTON, WASHINGTON, ENACTING A NEW CHAPTER 3.94 OF THE ARLINGTON MUNICIPAL CODE ENTITLED "ARLINGTON TRANSPORTATION BENEFIT DISTRICT"; ESTABLISHING A TRANSPORTATION BENEFIT DISTRICT; SPECIFYING THE BOUNDARIES FOR THE TRANSPORTATION BENEFIT DISTRICT; SPECIFYING THE POWERS AND FUNCTIONS OF THE DISTRICT; PROVIDING FOR SEVERABILITY AND FIXING A TIME WHEN THE SAME SHALL BECOME EFFECTIVE.

WHEREAS, the City Council of the City of Arlington has the responsibility under the Constitution of the State of Washington for the improvement, maintenance, protection and operation of public ways within the corporate limits of the City pursuant to RCW 35A.11.020 and Chapter 35A.47 RCW; and

WHEREAS, the improvement, maintenance, protection and operation of public ways requires preserving existing transportation improvements to avoid both catastrophic failure of the improvements which would require significant additional funds to reconstruct, as well as their gradual deterioration; and

WHEREAS, the "Washington Transportation Plan 2030" adopted by the Washington Transportation Commission ("State Transportation Plan") identifies the preservation and maintenance of the existing transportation system as the most critical transportation need; and

WHEREAS, the State Transportation Plan recognizes that the shortfall in funding to preserve, maintain and operate city streets is a matter of state-wide significance and accordingly, an eligible transportation improvement listed on the state plan within the meaning of RCW 36.73.015; and

Transportation Benefit District Board cont.



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- Sales tax approved!!
- Estimated 2014 fund
 - ▣ \$500,000 - \$700,00
- \$30,000 in 2013

A screenshot of a news article from HeraldNet. The article is titled "Arlington shows strong support for streets measure" and is dated Wednesday, August 7, 2013. The author is Gale Fiege. The article reports that voters in Arlington have approved a sales tax increase to fund street improvements. A sidebar on the right lists related news items, including "Rhetoric rampant over Mill Creek City Hall" and "State AG pursues penalty against food lobby group".

HeraldNet 50°
Fair
High: 50° Low: 43°
Full forecast | Web cam
EVERETT, WASHINGTON

Home News Towns Sports Business Opinion Entertainment Life Blogs Obituaries Cl
Local news • Nation/World • Northwest • Schools • Religion • Politics • Crime/Courts • Need to Know

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Recommend 0
+1 0 Share

Local news

- Developer given extra year to start Everett hotel project Oct. 24
- Woman in Reardon affair wants \$750K from county Oct. 23
- HOV lane driver caught with mannequin riding shotgun Oct. 24
- Teens could face felonies for explicit photo Oct. 24
- Small gesture helps troubled youth program Oct. 24
- Driver who died fleeing police had previous DUIs Oct. 23

Arlington News

Published: Wednesday, August 7, 2013, 12:01 a.m.
EMAIL ARTICLE | PRINT | JUMP TO COMMENTS

Arlington shows strong support for streets measure

By Gale Fiege, Herald Writer

ARLINGTON -- Voters in the city have approved a sales tax increase that will add 2 cents tax for every \$10 spent on goods and services in Arlington to pay for improvements, maintenance and preservation of city streets.

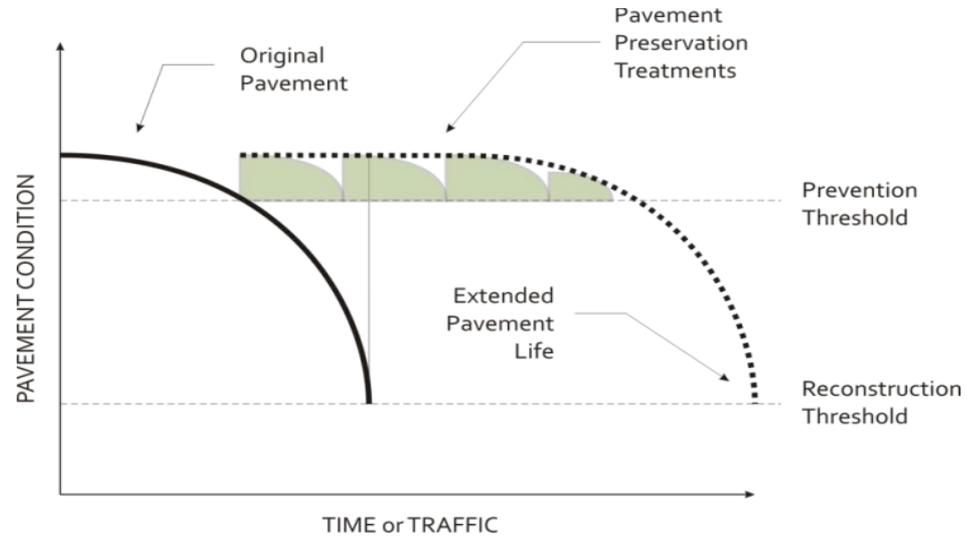
The proposition was winning voter approval Tuesday night by 1,140 votes, or about 66 percent of the vote. People voting "no" numbered 590, or about 34 percent.

- Rhetoric rampant over Mill Creek City Hall
- State AG pursues penalty against food lobby group
- Monroe candidates concerned about growth, safety



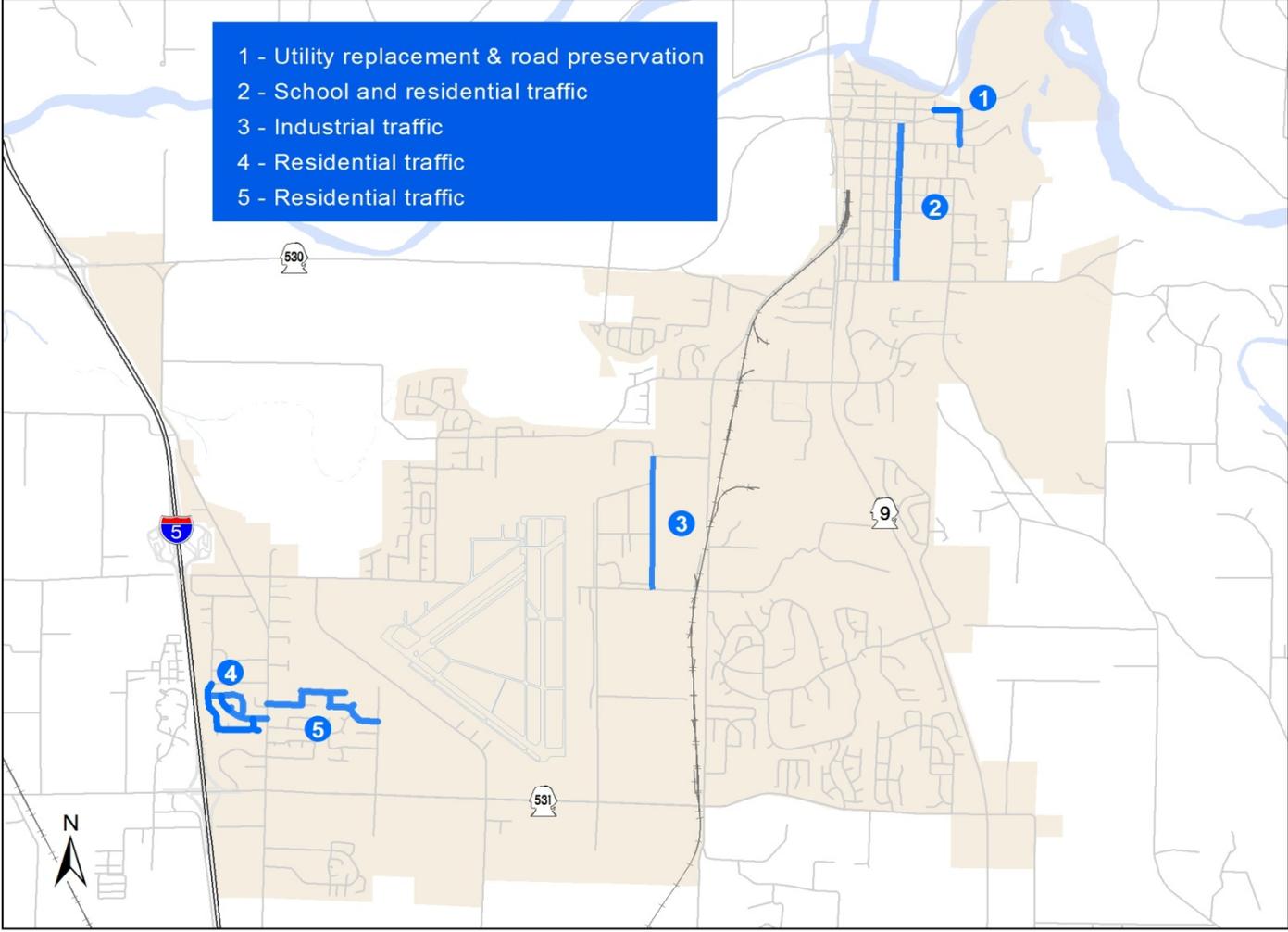
Preservation is Key!

□ Preservation vs Reconstruction



	PRESERVATION COST	AREA (SQYD)	RECONSTRUCTION COST	AREA (SQYD)	TOTAL COSTS
TOTAL	\$996,777	<u>336,073</u>	\$4,622,331	<u>180,270</u>	\$5,619,105

2014 Projects

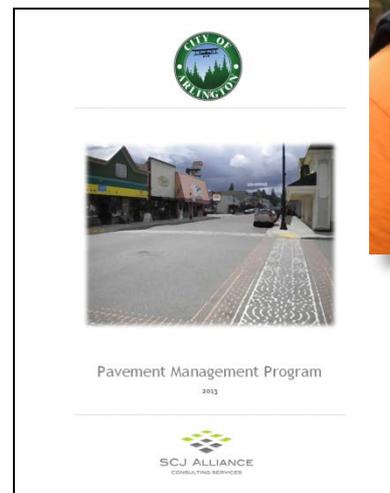


Future



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- 10 year program
- Complete the plan
- Use funding wisely
- Research reconstruction funding



Conclusion



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- Roads in need of repair
 - ▣ Funding, funding, funding
- Street survey
- Review the results
- Create Transportation Benefit District
- Start preserving Arlington roads!



Questions?



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