Pavement Management

Northwest Pavement Management Association

2016 Conference – October 25, 2016

Lindsi Hammond
Mike Maloney
Mike McCarthy
Todd Scholz

Pavement Management Done Right

- The right treatment
- On the right street
- At the right time
- Done right
- With the right communications

Session Outline

- Program Management
  - Mike McCarthy
- Street Evaluation and Testing
  - Todd Scholz
- Treatment Types and Uses
  - Lindsi Hammond and Mike Maloney
- Project Delivery and Program Communication
  - Mike McCarthy

Introductions

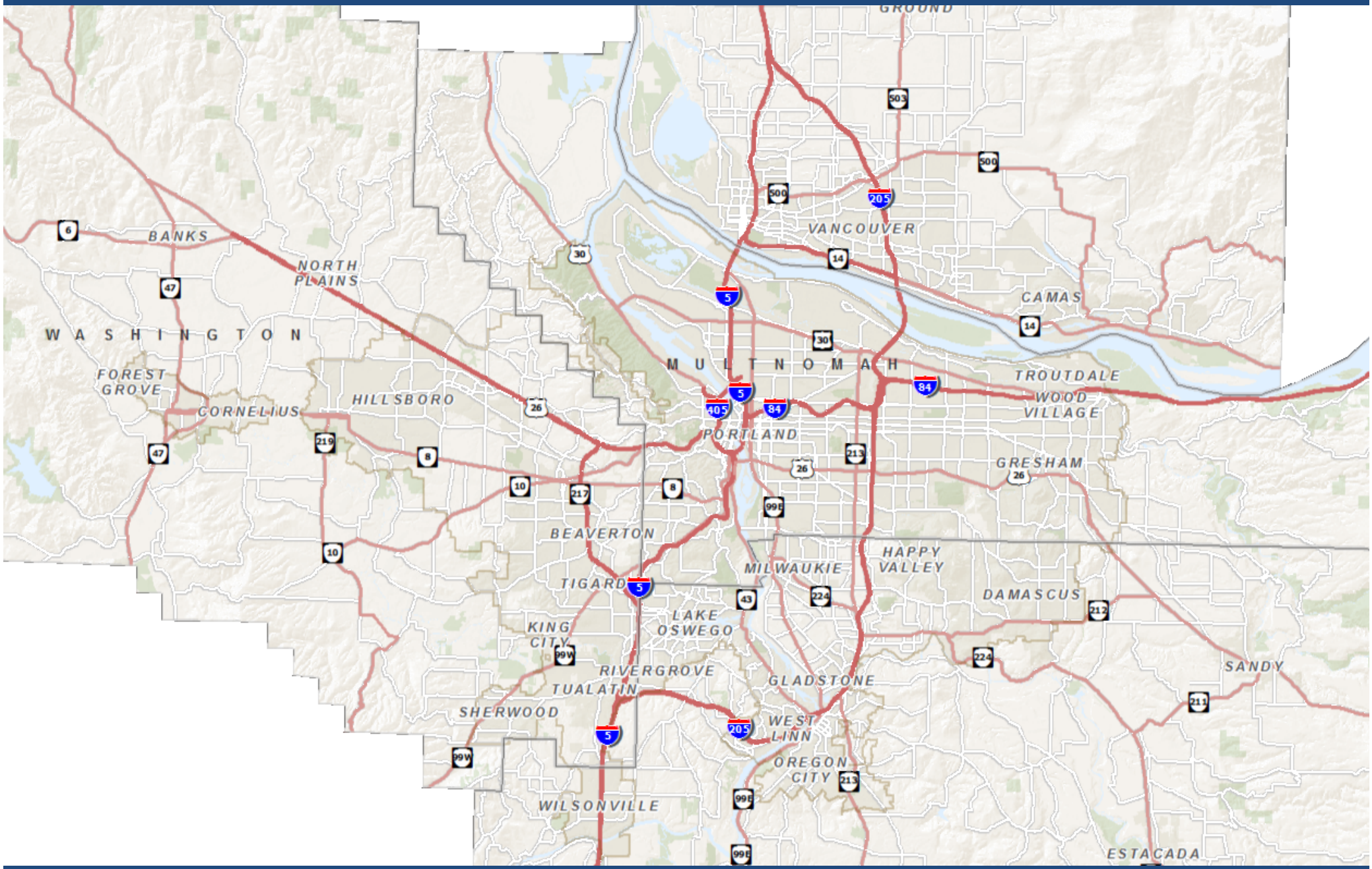
- Name
- Agency/Company
- Role
- Involvement in Pavement Management

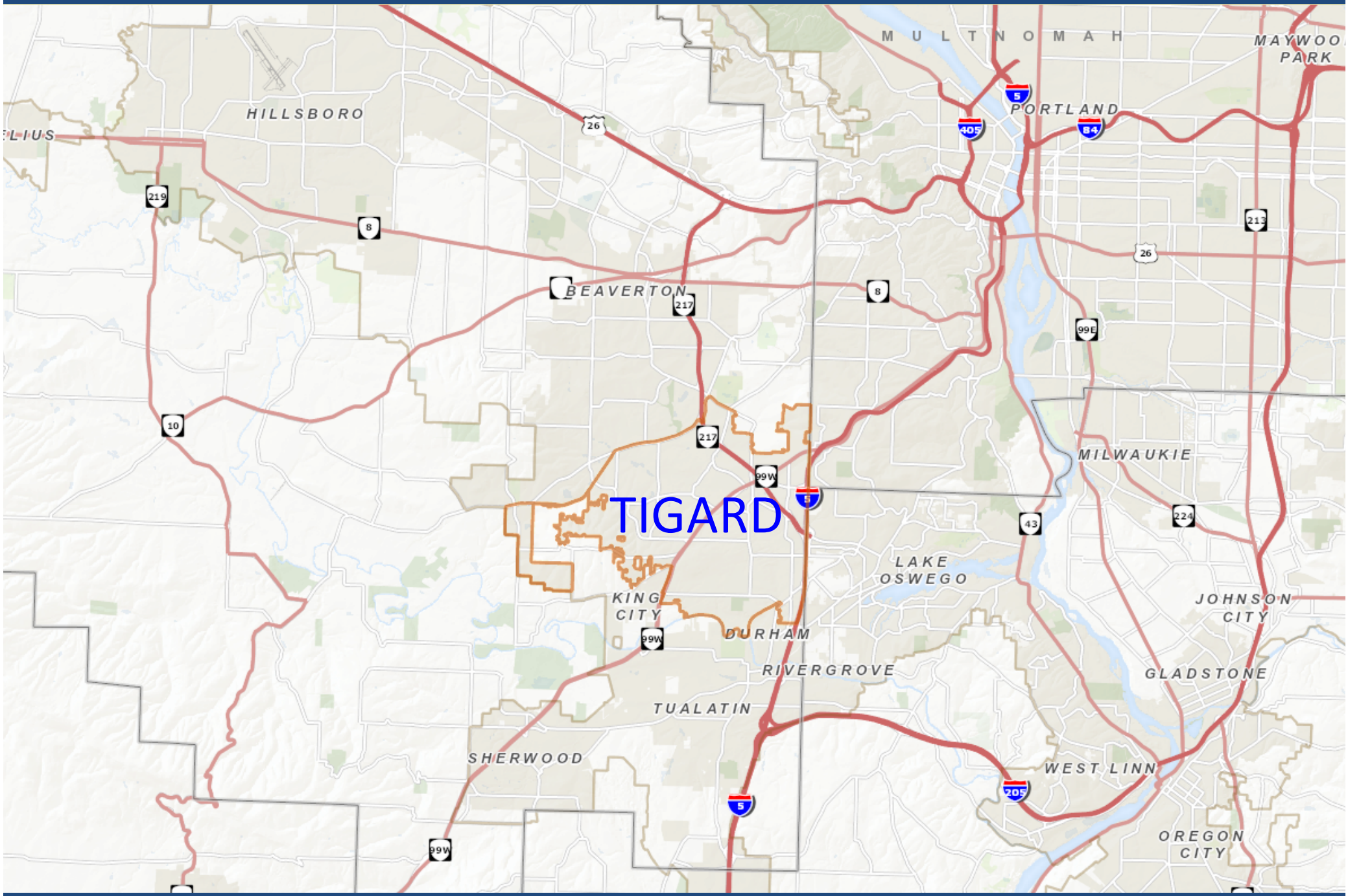
Acronym / Jargon Police

- Goal: Speak English
- If you have a question or don’t understand a term please ask. Someone else likely has the same question.

Pavement Management Program

- Overall Approach
- Inventory and Analysis
- Crack Seal
- Slurry Seal
- Overlays
  - Street Selection
- Reports
- Funding
- Collaboration


BANKS
NORTH PLAINS
WASHINGTON
FOREST GROVE
CORNELIUS
HILLSBORO
BEAVERTON
TIGARD
TUALATIN
SHERWOOD
KING CITY
RIVERGROVE
LAKE OSWEGO
WILSONVILLE
MILWAUKIE
PORTLAND
MULTNOMAH
VANCOUVER
CAMAS
WASHOUGAL
TROUTDALE
WOOD VILLAGE
GRESHAM
HAPPY VALLEY
DAMASCUS
GLADSTONE
WEST LINN
OREGON CITY
SANDY
ESTACADA


TIGARD
MULTNOMAH
PORTLAND
HILLSBORO
BEAVERTON
MILWAUKIE
LAKE OSWEGO
KING CITY
DURHAM
RIVERGROVE
TUALATIN
SHERWOOD
WEST LINN
OREGON CITY
JOHNSON CITY
GLADSTONE
MAYWOOD PARK
26
8
217
99W
5
405
84
205
43
224
213
99E
219
10

Tigard Basic Facts

- Population: 50,787
- Incorporated: 1961
- Most streets built in ’60s, ’70s, and ’90s
- About 3,000 businesses
- Strategic Plan: Walkability

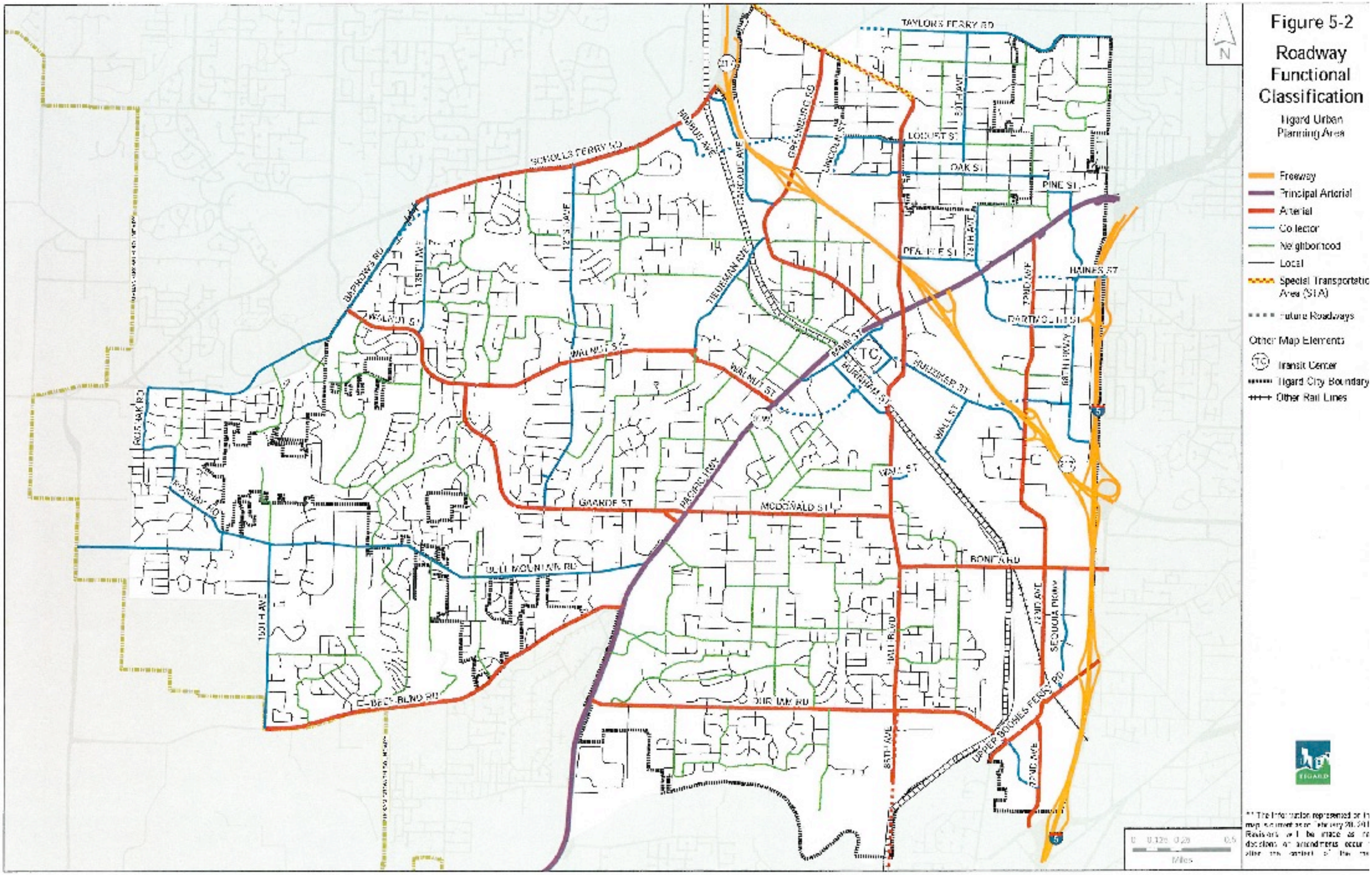


Figure 5-2
Roadway Functional Classification
Tigard Urban Planning Area
Freeway
Principal Arterial
Arterial
Collector
Neighborhood
Local
Special Transportation Area (STA)
Future Roadways
Other Map Elements
Transit Center
Tigard City Boundary
Other Rail Lines
TAYLORS FERRY RD
SCHOLLS FERRY RD
LOCUST ST
OAK ST
PINE ST
HAINES ST
DARTMOUTH ST
WALNUT ST
MAIN ST
BURNHAM ST
COMMERCIAL ST
WALL ST
GAARDE ST
MCDONALD ST
BONITA RD
BULL MOUNTAIN RD
BEEF BEND RD
DURHAM RD
UPPER BOONES FERRY RD
SEQUOIA PKWY
72ND AVE
68TH PKWY
HALL BLVD
85TH AVE
150TH AVE
135TH AVE
121ST AVE
ROY ROGERS RD
BARROWS RD
TIEDEMAN AVE
PACIFIC HWY
GREENBURG RD
HAMPTON ST
ROSHAK RD
Miles

Tigard Pavement

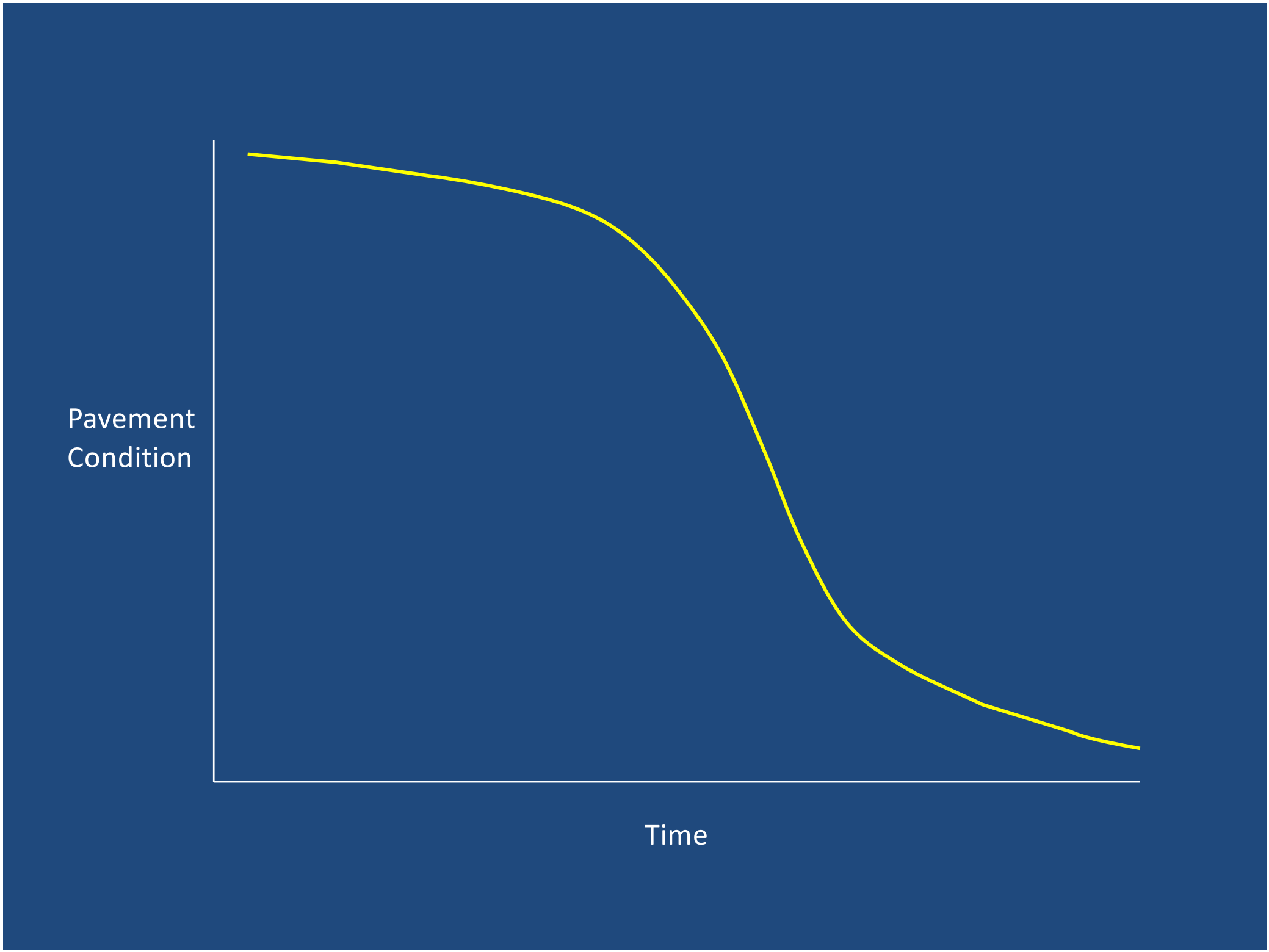
- 154 centerline miles
- 330 lane miles
- Many streets built in ’60s, 70s, and 90s
- PCI 72 (up from 68 in 2009)
- 22 mile backlog

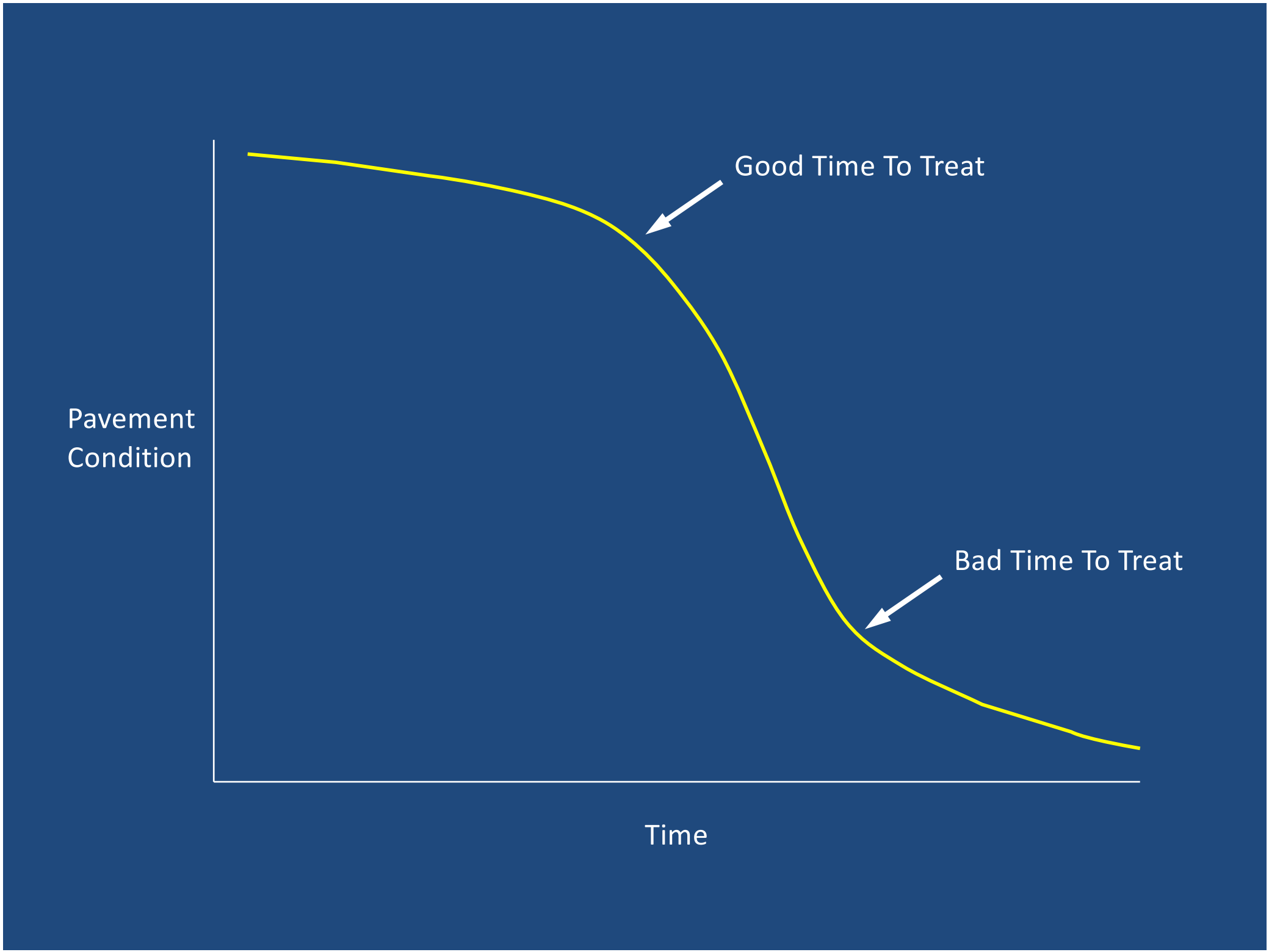
Funding

- FY 16-17 Budget: $1,985,000
- Funding Source: Street Maintenance Fee
  - Started in 2003 at $800k per year
- Increased in 2010 to $1.6m per year in 2013 to ‘hold the line’ on pavement condition
- Funding will increase by $500,000/yr in 2017 from
- city gas tax or street fee

Overall Approach

- Goal: maximize value of taxpayer dollars
- Preventive maintenance is the most cost-effective approach to manage pavement
- Our approach: Preventive maintenance


Pavement
Condition
Time


Good Time To Treat
Bad Time To Treat
Pavement Condition
Time

Two Main Causes of Pavement Deterioration

- Vehicle Loading
  - Arterials and Collectors
  - Commercial and Industrial
  - Truck Routes, Bus Routes
    - Pavement Overlay

- Weathering
  - Residential Streets
    - Slurry Seal

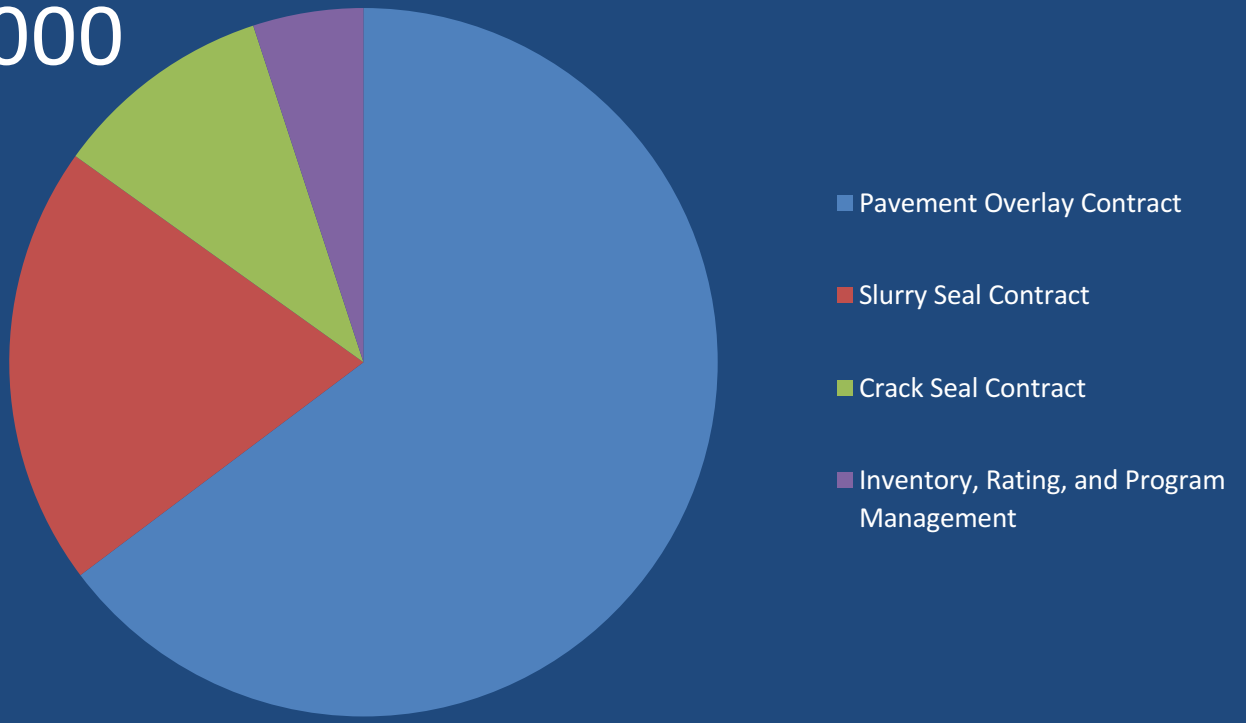
Preventive Maintenance Prioritization

- First: Inventory and evaluation
- Second: Crack Seal
- Third: Slurry Seal good residential streets
- Fourth: Overlays on busy streets

- Remaining Dollars: Overlay/Reconstruct backlog streets

Expense Breakdown

- Rating/Inventory/Program Mgt $100,000
- Crack Sealing $200,000
- Slurry Sealing $400,000
- Overlay $1,285,000



Pavement Inventory

- Software (Streetsaver et al)
- Spreadsheet
  - Street Network
  - Work completed
  - Pavement ratings
  - Deterioration forecast

SEGID	Street	From	To	Length (Ft)	Width (Ft)	2016 Average Daily Traffic (ADT)	Daily Large Vehicle	Traffic Usage factor	End of 2013 Post-Treatment OCI	2014 Pavement Treatment	End of 2014 Post-Treatment OCI	2015 Pavement Treatment	End of 2015 Post-Treatment OCI	2016 Pavement Treatment	unit cost	2016 Pavement Treatment Cost	End of 2016 Post-Treatment OCI	2017 Pavement Treatment	unit cost	2017 Pavement Treatment Cost	End of 2017 Post-Treatment OCI
1043	72ND AV	BEVELAND ST	HERMOSO WY	429	30	13000	600	19000	88.4		80.0		76.5	Part OL	8	11,440	80.0			-	76.5
1868	72ND AV	BONITA RD	LANDMARK LN	1091	42	11500	700	18500	88.4		86.0		83.1			-	79.9			-	76.5
2020	72ND AV	CARDINAL LN	BONITA RD	1280	40	12500	750	20000	88.2		88.0		85.2			-	82.1			-	78.8
1476	72ND AV	CHERRY DR	FIR ST	553	40	13000	700	20000	88.2		84.0		80.8			-	77.4			-	73.6
2824	72ND AV	City Limits	DURHAM RD	514	66	15000	700	22000	48.0		59.0		54.2	OLY2	24	90,464	100.0			-	98.6
775	72ND AV	CLINTON ST	BAYLOR ST	531	48	8500	400	12500	89.3		88.0		85.6			-	83.1			-	80.4
848	72ND AV	DARTMOUTH ST	CLINTON ST	469	48	9000	450	13500	89.1		89.0		86.7			-	84.1			-	81.4
2622	72ND AV	DURHAM RD	UPPER BOONES FE	1888	36	5000	300	8000	60.3		66.0		63.0	OLY2	20	151,040	100.0			-	98.9
933	72ND AV	ELMHURST ST	DARTMOUTH ST	561	74	12200	600	18200	24.4	CIP	97.0		95.3			-	93.4			-	91.2
1400	72ND AV	FIR ST	VARNS ST	356	40	14000	750	21500	59.4		54.6		80.0			-	76.4			-	72.4
1116	72ND AV	GONZAGA ST	BEVELAND ST	363	40	15000	750	22500	31.3	Dev	70.0		65.6	OLY2	20	32,267	95.0			-	92.9
1155	72ND AV	HAMPTON ST	GONZAGA ST	344	40	16000	800	24000	41.9	Dev	75.0		70.8	OLY2	20	30,578	95.0			-	92.9
989	72ND AV	HERMOSO WY	ELMHURST ST	361	24	12200	600	18200	88.5		90.0		87.5			-	84.8			-	81.8
1189	72ND AV	Hwy 217 NB Ramp	HAMPTON ST	178	44	18000	800	26000	34.0	Dev	70.0		65.3	OLY2	20	17,404	95.0			-	92.8
2204	72ND AV	KABLE LN	REDWOOD LN	668	40	12000	650	18500	88.4		89.0		86.4			-	83.5			-	80.4
1706	72ND AV	LANDMARK LN	TECH CENTER DR	1010	40	11500	650	18000	88.5		88.0		85.3			-	82.4			-	79.2
2105	72ND AV	REDWOOD LN	CARDINAL LN	696	40	12500	700	19500	88.3		89.0		86.3			-	83.4			-	80.2
1499	72ND AV	SANDBURG ST	CHERRY DR	128	40	13000	700	20000	88.2		87.0		84.1			-	80.9			-	77.5
1583	72ND AV	TECH CENTER DR	SANDBURG ST	493	40	12000	650	18500	88.4		89.0		86.4			-	83.5			-	80.4
2363	72ND AV	UPPER BOONES FER	KABLE LN	1027	40	11000	600	17000	88.6		89.0		86.5			-	83.7			-	80.7
1348	72ND AV	VARNS ST	VARNS ST	182	44	15000	800	23000	68.7	Dev	82.0		81.0			-	77.4			-	73.4
1330	72ND AV	VARNS ST	HUNZIKER ST	274	44	18000	600	24000	63.4	Dev	76.0		71.9			-	67.5			-	62.8
1869	BONITA RD	72ND AV	74TH AV	944	46	19000	900	28000	80.0		75.5		85.0			-	81.1			-	76.7
1865	BONITA RD	74TH AV	MILTON CT	265	46	18000	600	24000	81.3		77.3		89.0			-	85.8			-	82.3
1858	BONITA RD	76TH AV	79TH AV	737	46	17000	450	21500	57.8		52.5		85.0			-	81.5			-	77.6
1851	BONITA RD	79TH AV	81ST AV	607	46	16500	400	20500	59.0		53.8		83.0			-	79.4			-	75.4
1845	BONITA RD	81ST AV	83RD CT	489	46	16000	400	20000	52.8		47.6		82.0			-	78.3			-	74.3
1852	BONITA RD	83RD CT	HALL BLVD	463	46	16000	400	20000	52.8		47.6		82.0				78.4				75.4

Main Sheet | Summary Sheet | Sheet3

ady

Average: 31302.6 Count: 24580 Sum

Pavement Rating

- Contracted
- Frequency: Arterials every two years
- Collectors every three years
- Locals every four years

Asphalt Concrete
Pavement Distress Identification
CRIB SHEET

NO.	TYPE	LOW	MEDIUM	HIGH
1 (p. 6)	**Alligator Cracking**	fine; few interconnecting cracks	network of cracks	well-defined network with spalling; potholes
2 (p. 13)	**Block Cracking**	< 3/8"; any filled crack	3/8" to 3"; any filled crack with light, random cracking	> 3"; any crack with medium to high random cracking
3 (p. 16)	**Distortions**	noticeable vehicle vibrations	significant vehicle vibrations	excessive vehicle vibration; must reduce speed
4 (p. 20)	**Longitudinal & Transverse Cracking**		— same as #2 —	
5 (p. 25)	**Patching & Utility Cut Patching**	good condition; low ride quality	moderate deterioration; medium ride quality	patch needs to be replaced
6 (p. 30)	**Rutting & Depressions**	1/2" to < 1"	1" to < 2"	> 2"
7 (p. 33)	**Weathering & Raveling**	aggregate/binder starting to wear away; some pitting	moderately rough surface texture; pitted	aggregate/binder worn away; seal loss

Common Deterioration Rates

- Arterial: 12 to 20 Years
- Collector: 15 to 25 Years
- Local Industrial: 12 to 30 Years
- Residential Overlay: 20 to 30 Years
- Residential Slurry Seal: 8 to 12 Years

- Depending on traffic, loading, weather, base strength, mix quality, etc., etc., etc.

Pavement Crack Seal

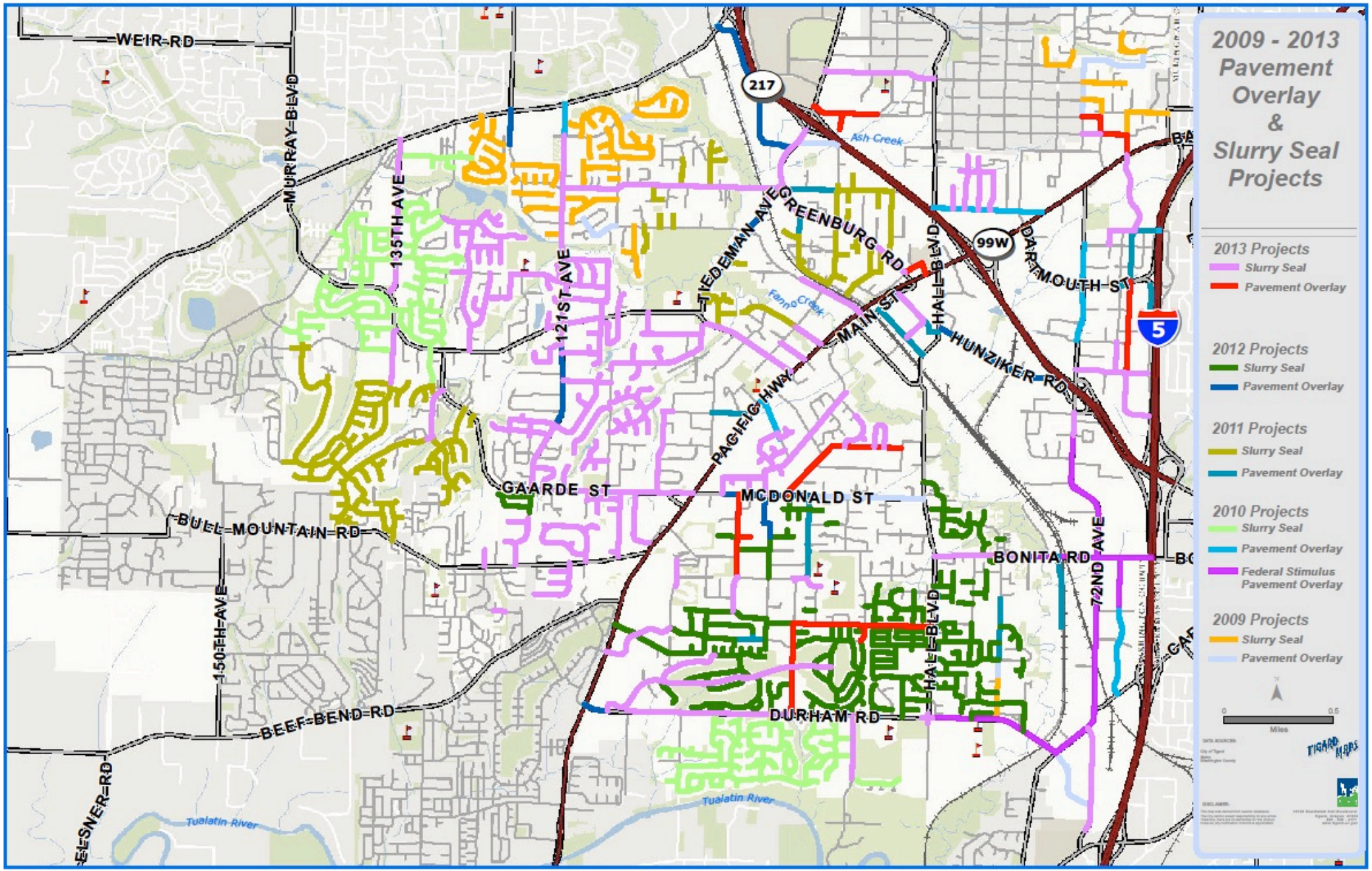
- Keeps water from eroding pavement
- Reduces spreading of cracks
- Keeps cracking from becoming deeper
- Helps keep cracks from reflecting into future overlays

- Goal: Seal all streets every five years

Slurry Seal

Slurry Seal Street Selection

- Local and residential streets
- Primary distress is weathering
- Deteriorated enough that slurry makes a clear difference
- Not too much cracking
- Digouts small enough our crews can do them
- Streets we can close
- By geographic area


2009 - 2013 Pavement Overlay & Slurry Seal Projects
2013 Projects
Slurry Seal
Pavement Overlay
2012 Projects
Slurry Seal
Pavement Overlay
2011 Projects
Slurry Seal
Pavement Overlay
2010 Projects
Slurry Seal
Pavement Overlay
Federal Stimulus Pavement Overlay
2009 Projects
Slurry Seal
Pavement Overlay
Miles
WEIR RD
MURRAY BLVD
135TH AVE
121ST AVE
TIEDEMAN AVE
GREENBURG RD
Ash Creek
Fanno Creek
MAIN ST
HALL BLVD
DARTMOUTH ST
HUNZIKER RD
PACIFIC HWY
GAARDE ST
MCDONALD ST
BONITA RD
72ND AVE
BULL MOUNTAIN RD
150TH AVE
BEEF BEND RD
DURHAM RD
Tualatin River
217
99W
5


Trucking Co. Inc.
642-2531
BEAVERTON, OR

Overlay Street Candidate Selection

- Traffic Volume
- Pavement Condition
- Heavy Vehicle Volume
- How much worse will it get in a year?
- Opportunities to combine streets
- Other factors (development, pipe projects, etc.)
- Typically no cul-de-sacs (for now)


TEREX
Alderbrook Dr & Alder-
brook Circle
07.17.2013 10:48

Collaboration

- Name
- Agency/Company
- What you do
- Exchange cards, etc.

- Street miles
- Budget
- Treatments used
- Issues you face
- Experiences
  - Good
  - Not so good

Result: 200% Street List

- Geotechnical Evaluation
  - Which are good overlay candidates?
  - How is the road structure?
  - Which need more work?
- Consider Utility Work

Break

Project Delivery and Program Communication

- Project Design
- Project Inspection
- Striping

- Public Information

- Program Reporting
  - Pavement Condition Index
  - Backlog
- Fee Discussions

Slurry Seal


72544PR
STOP
7/18/2012

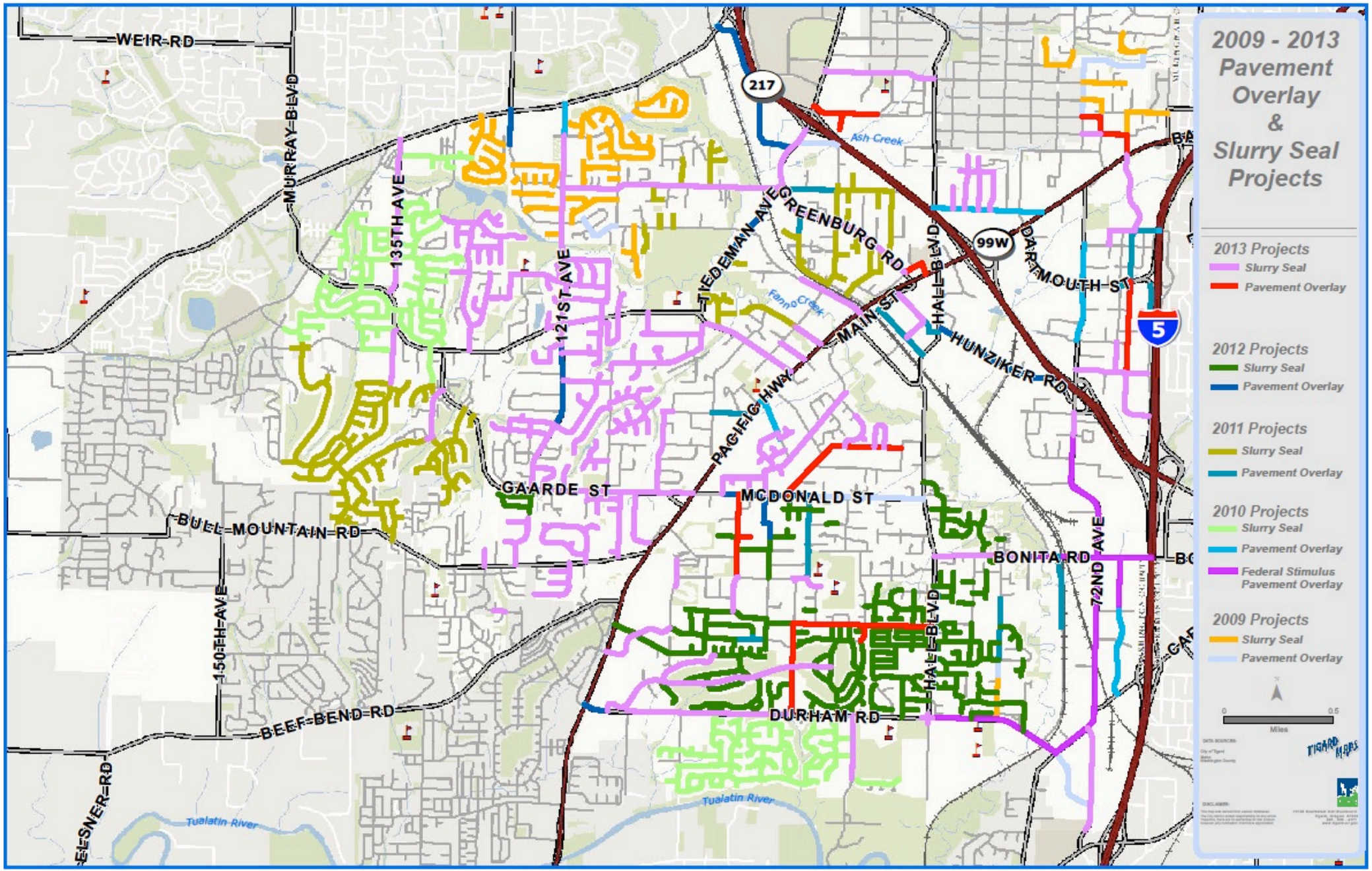

CITY OF TIGARD
SLURRY SEAL


7/18/2012 12:15

Slurry Seal

- Best treatment for a street if its primary distress is weathering
- Proper Preparation:
  - Dig out and replace any areas of failed pavement
  - Seal cracks (1/4” and wider)
- Type 2 Slurry (ODOT / APWA Spec)
- $1.50 to $3 per square yard; 15 to 35 cents per square foot


TIGARD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150TH AVE
BEEF BEND RD
DURHAM RD
Tualatin River
217
99W
5

Slurry Seal Advantages

- Most PCI Improvement Per Dollar
- Cover Many Miles With Small Budget
- Keeps Good Streets Good
- Catch Basins/Valves/Manholes Stay In Place
- Great For Weathering

Slurry Seal Disadvantages

- Street Closures
- Extensive Public Notice Necessary
- Raveling
- Surface Quality Not As Good As Overlay
- Does Very Little For Cracking

Slurry Seal Public Notice

- Cityscape newsletter articles – July 1
- Mailed Letter and Map – 2 weeks ahead
- Website schedules and maps – 2 weeks ahead
- Area signs – 2 wks ahead
- Door Hangers - 48 to 96 hrs ahead
- Signs - 48 to 72 hrs ahead
- Council and Committee Briefings
- Project phone hotline
- Extensive phone conversations
- Extensive face-to-face conversations

Project Communication

- The single biggest problem in communication is the illusion that it has taken place

Pavement Overlay

Overlay Candidate Selection

- PM Software Identifies Initial candidates
  - By Traffic Volume
  - By Pavement Condition
  - By Distress Type
- More Evaluation Is Necessary
  - Pavement Structure?
  - Best Treatment Type?
  - Fitting In With Surroundings?

Overlay Street Candidate Selection

- Traffic Volume
- Pavement Condition
- Heavy Vehicle Volume
- How much worse will it get in a year?
- Opportunities to combine streets
- Other factors (development, pipe projects, etc.)
- Typically no cul-de-sacs (for now)

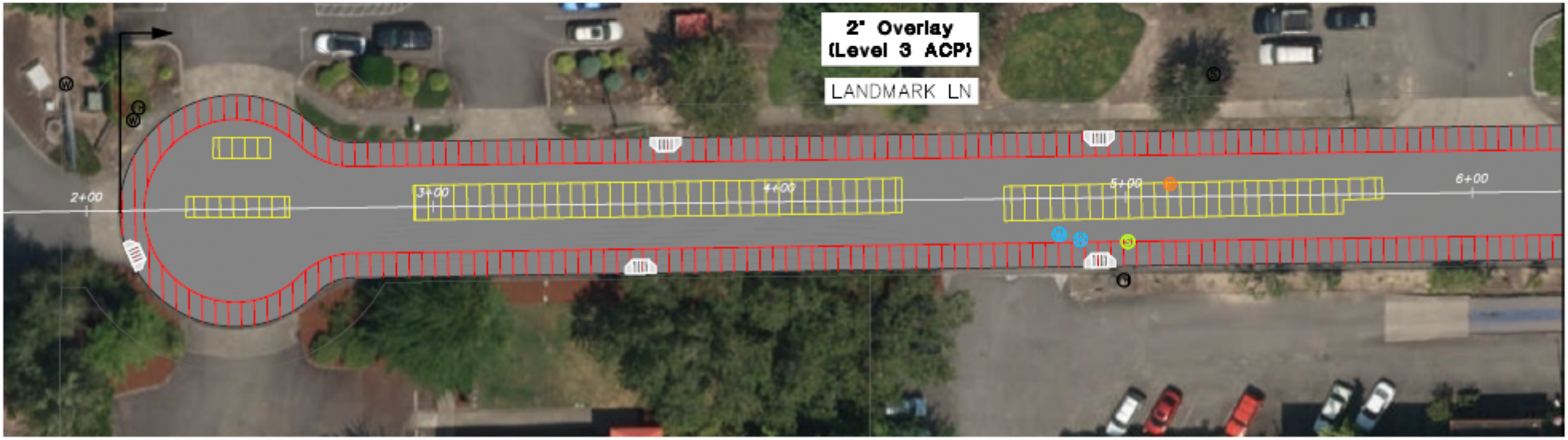
Overlay Design Considerations

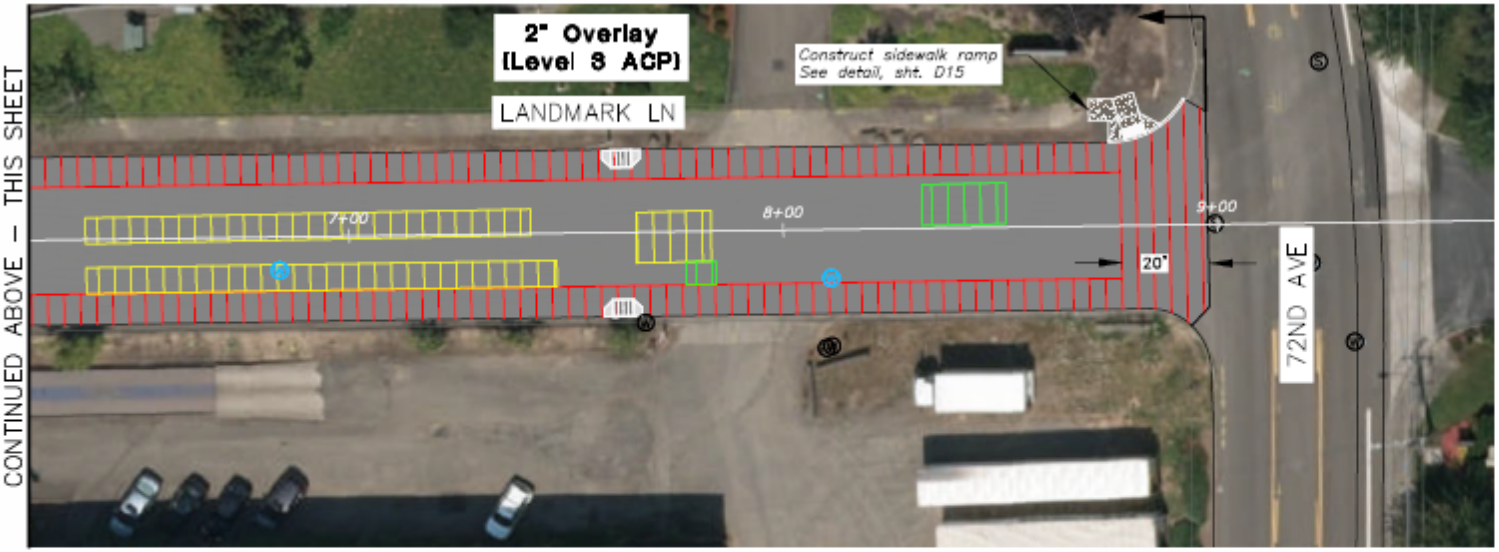
- Pavement Structure
- Future Traffic and Loading
- Cross-Slope
- Curb, Gutter, Driveways to Match
- Catch Basins, Manholes, etc.
- Does It All Need To be Paved?
- How Far Into Side Streets?

Typical Overlay 2+2

- Level 2 or 3 ½” Dense HMAC or WMAC
- 2-inch grind and inlay of bad areas
- 2-inch overlay of whole street
- Wedge grind, Inlet and Valve adjustments, etc
- Restriping opportunity
- $1.50 to $3 per square foot

Overlay Plans Sheet





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REGISTERED PROFESSIONAL ENGINEER 83954 OREGON MAY 22, 2015 SINCLAIR B. BURR
RENEWS 12-31-17

Revisions and Addendums			
Description	Date	No.	By

SCALE: 1" = 30'
30' 15' 0 30'

DESIGN: SBB | DRAWN: SBB | CHECK: GEC | PROJECT NO: 2016-95001 OL

ENGINEERING DIVISION
PUBLIC WORKS DEPARTMENT
13125 S.W. HALL BLVD.
TIGARD, OREGON 97223
VOICE: 503-639-4171
FAX: 503-624-0752
WWW.TIGARD-OR.GOV

MSA

FY 2016-17 PAVEMENT MANAGEMENT PROGRAM

Pavement Rehabilitation

Paving Layout - Landmark Lane

SHEET C22
45 OF 76

Curb Ramp Retrofits

- Required by ADA with ‘reconstruction’
- FHWA guidance: ‘reconstruction’ is anything that could add or replace more than ¼” of pavement
- Rough cost: $5,000 per ramp
- Approximately 25% of overlay cost

Inspection

Inspection – Key Issues

- Mix Design Review
- Traffic Control
- Grind Locations and Depths
- Timely Feedback to Contractor


RX-600e
HATCH WESTERN CO.
CITY OF TIGARD
ADOPT-A-
STREET
LUKE-DORF
A HEALING
COMMUNITY


STOP


KNIFE RIVER
CAT
SCHO

Inspection – Key Issues 2

- Paving/Matching/Grade Issues
  - Catch them while paving – not punch list
  - Ensure adequate tack coat – bonding is key
- Compaction Testing
- Striping Layout


CAT
AP1055D
MARTHA ST


Ingersoll-Rand
DD-90HF


CATERPILLAR

A Golden Opportunity …


SW Pfaffle St


FOR LEASE
503.221.9900
kiddermathews.com
STEVEN KLEIN
PETER STALICK
GLP


10-foot
wide
lane
3-foot
shoulder

People
Drive
A
Street

Based
On
How It
Looks

People
Drive
A
Street

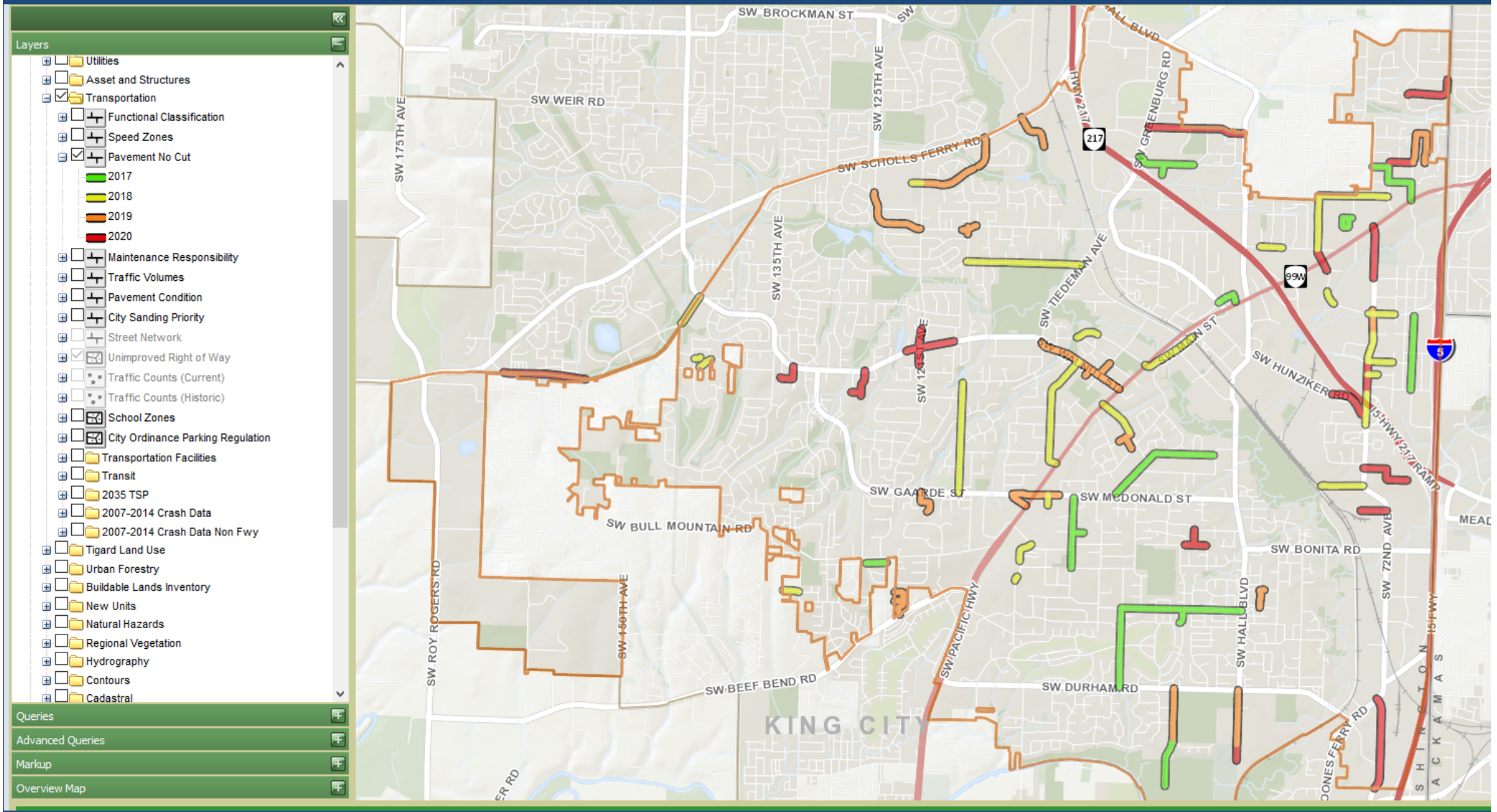
Based
On
How It
Looks


SLOW

If a Street Has Speed Bumps

- Bumps need to be removed for paving
- Conduct traffic/speed study
- Survey neighbors and those whose primary access is that road
- Decide whether or not to reinstall bumps

Street Cut Moratorium

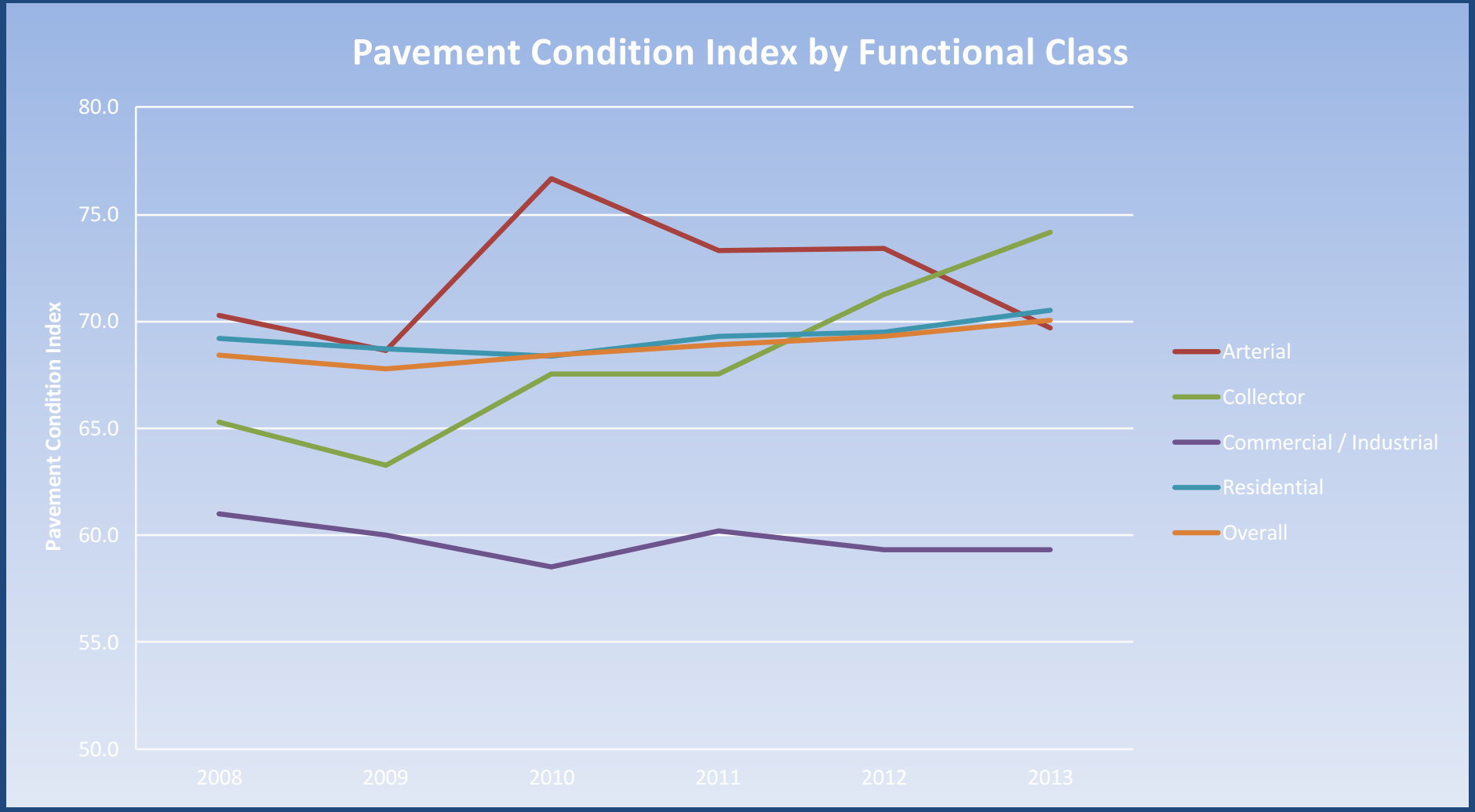


Reporting

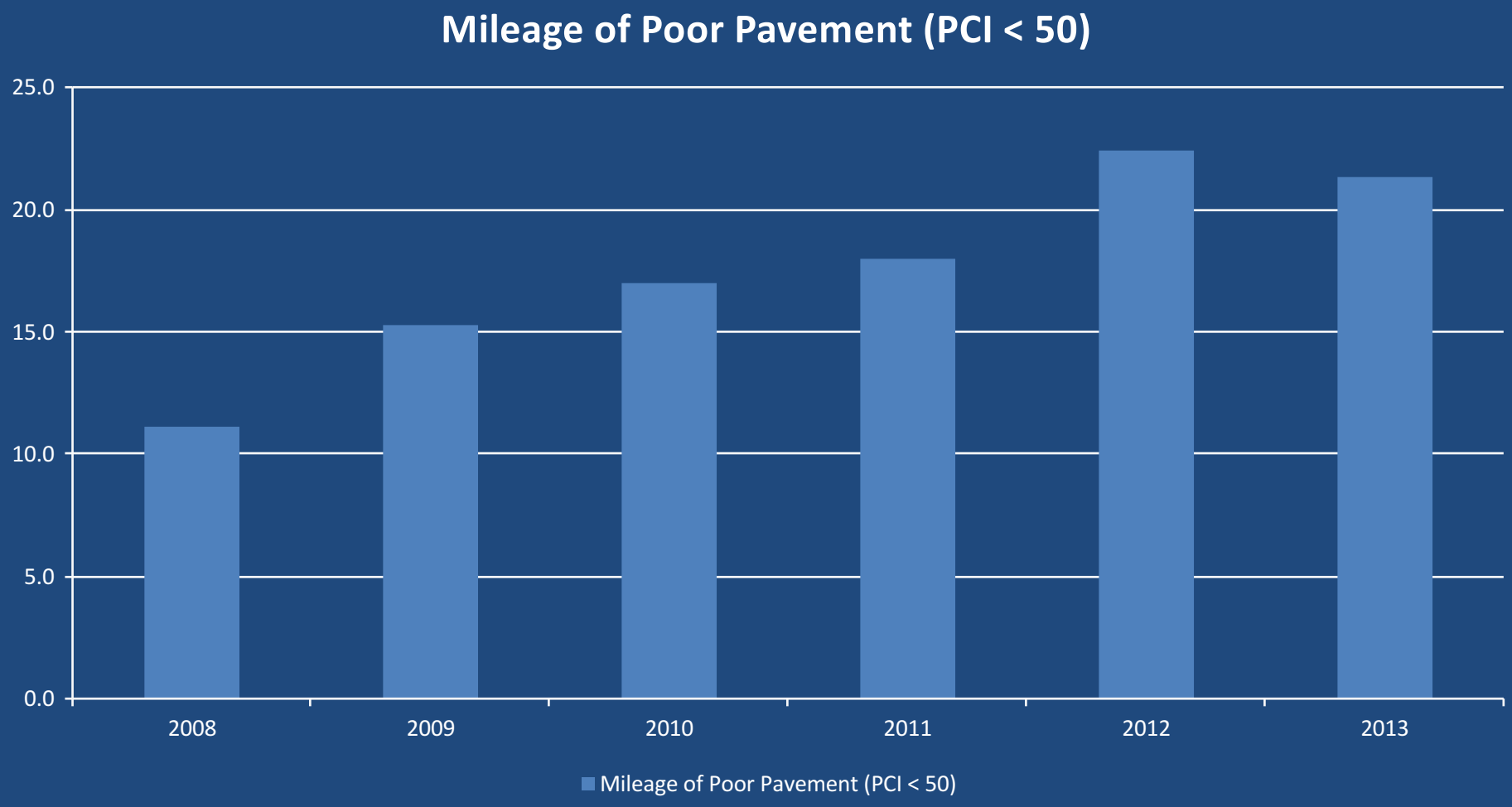
- Key Facts
  - Systemwide Pavement Condition Index (PCI)
  - Cost to maintain current PCI
    - A million dollars buys us about one point of PCI
    - Normal Deterioration: About 1.8 per year
  - Backlog mileage and cost

- 'Elevator Speech'

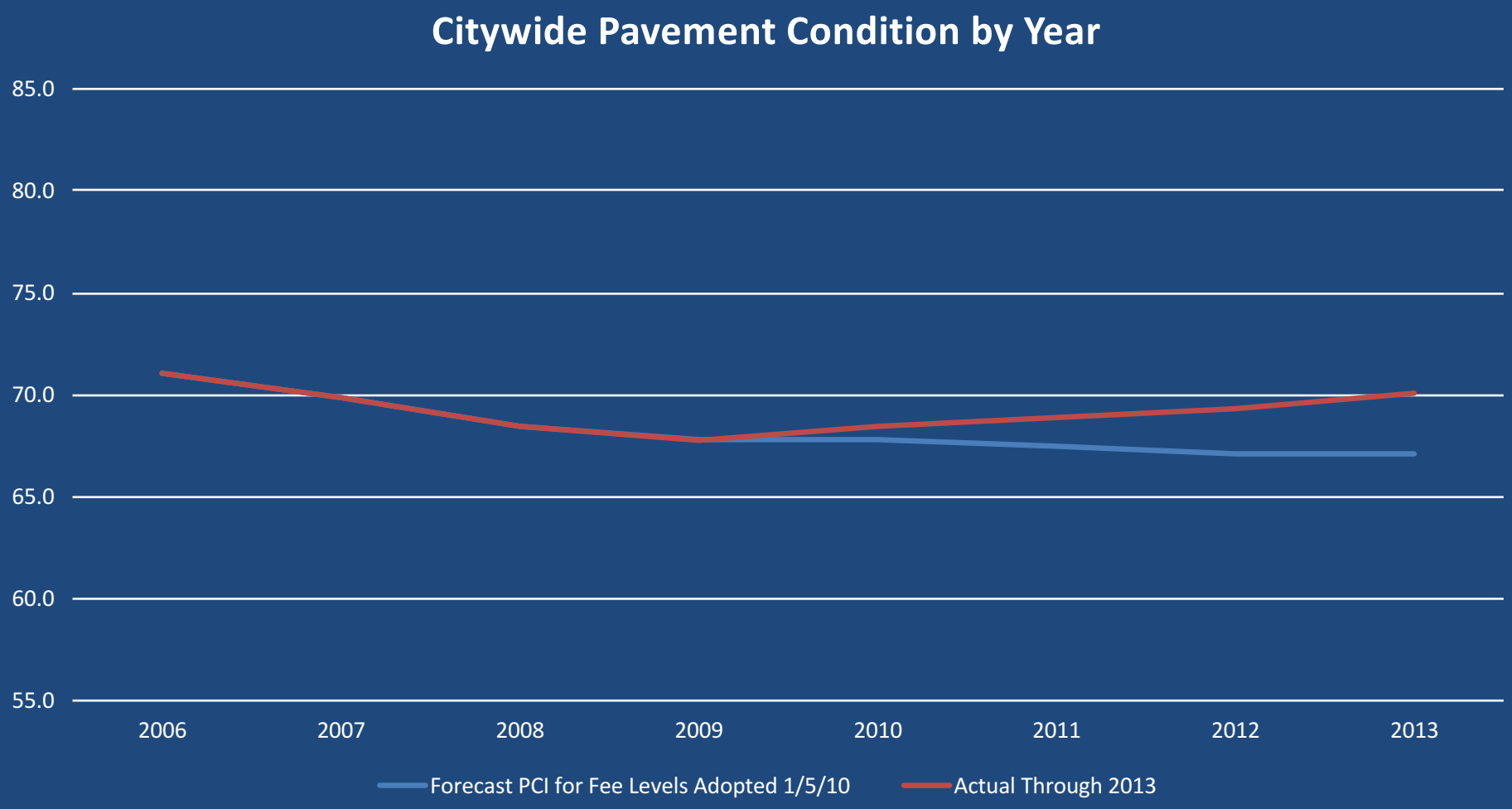
Reporting


Pavement Condition Index by Functional Class
Pavement Condition Index
80.0
75.0
70.0
65.0
60.0
55.0
50.0
2008
2009
2010
2011
2012
2013
Arterial
Collector
Commercial / Industrial
Residential
Overall

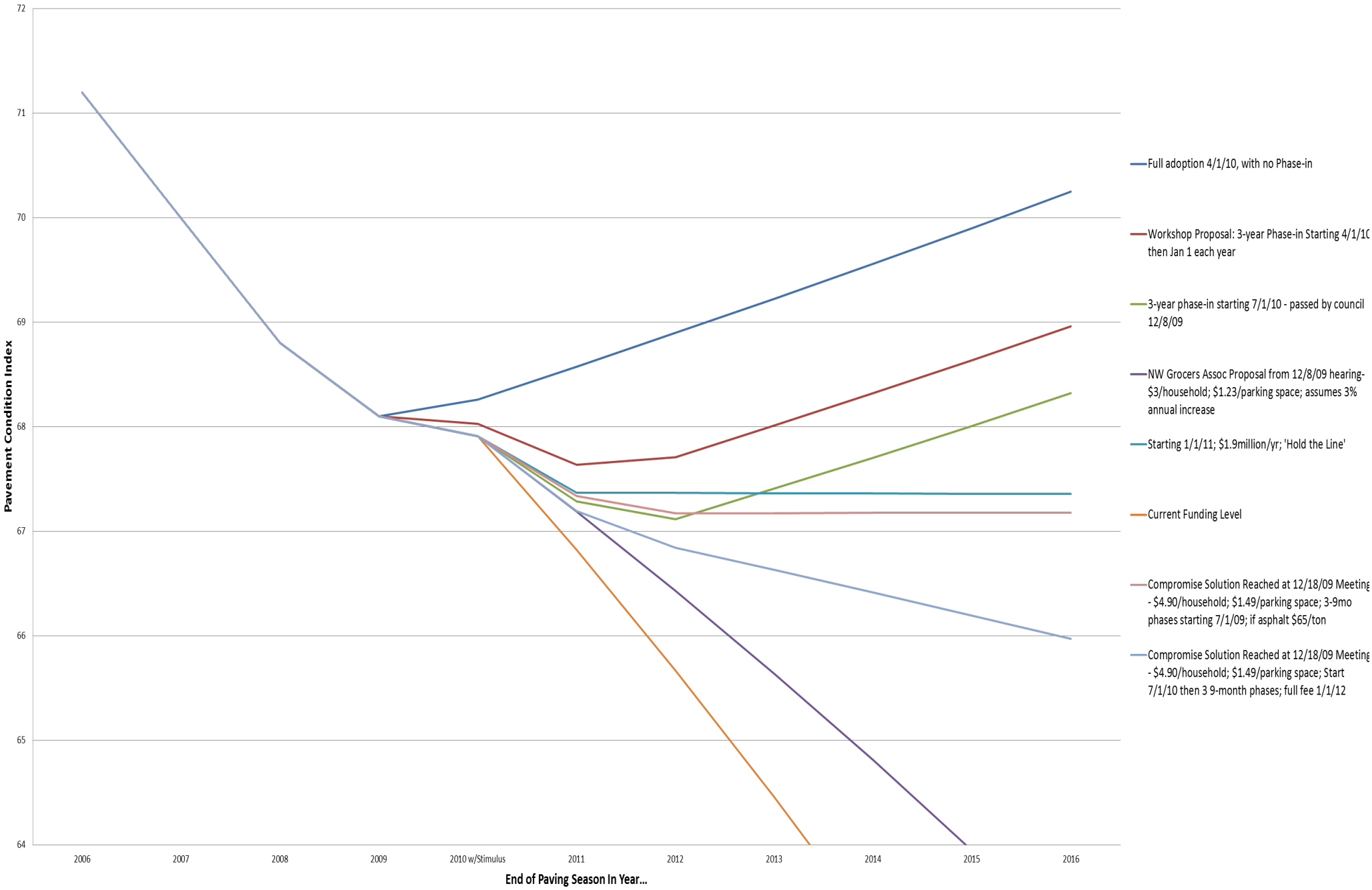
Paving Backlog



Comparison to Forecast



Tigard Citywide Pavement Condition Index by Funding Scenario



Funding

- FY 16-17 Budget: $1,985,000
- Funding Source: Street Maintenance Fee
  - Started in 2003 at $800k per year
- Increased in 2010 to $1.6m per year in 2013 to ‘hold the line’ on pavement condition
- Funding will increase by $500,000/yr in 2017 from
- city gas tax (on ballot) or street fee

Street Maintenance Fee Rates

- Residential: $5.30 per home per month
- Nonresidential: $1.86 per required parking space (if built today) per month
- Used primarily for street maintenance
  - $150,000 used for right-of-way maintenance

Street Maintenance Fee History

- Adopted in 2003
  - $800,000 per year
- Increased in 2009-10
  - $1.6 million per year plus inflation adjustment
- Rebalanced and Increased in 2016
  - $2.4 million per year

PUBLIC WORKS

Streets and Street Maintenance

The city has over 300 miles of streets and 12 miles of paved pathways which it is responsible for maintaining or developing. The Engineering Division and the Street Maintenance Division share the construction and maintenance responsibilities which include traffic signals, streetlights, guardrails, barricades, pavement surfaces, right-of-way (shoulders, islands, etc.), and street sanding during inclement weather.

Street Maintenance Fee Update

The street maintenance fee (SMF) is a charge that is paid by Tigard residents and businesses on their monthly utility bill. The fee is used primarily to fund routine maintenance of Tigard's roads through the Pavement Management Program (PMP). In addition to the PMP, the SMF pays for $100,000 of right-of-way (ROW) maintenance. The ROW maintenance keeps plantings and grounds around and in the medians of larger roads in good condition

Launch Interactive Map

City Council Approves New Street Maintenance Fee

What is a street maintenance fee?

A street maintenance fee is primarily used to fund the routine maintenance of Tigard's 150 centerline miles of streets and to maintain plantings in medians and corridors. It is charged to Tigard residents and businesses on their monthly utility bill.

What is changing?

After a public comment period, a survey of residents and businesses, and a public hearing, the Tigard City Council approved

Any Questions?

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Thank you for your service to our community!