

# 2016 State of the Roadway Network in Port Orchard

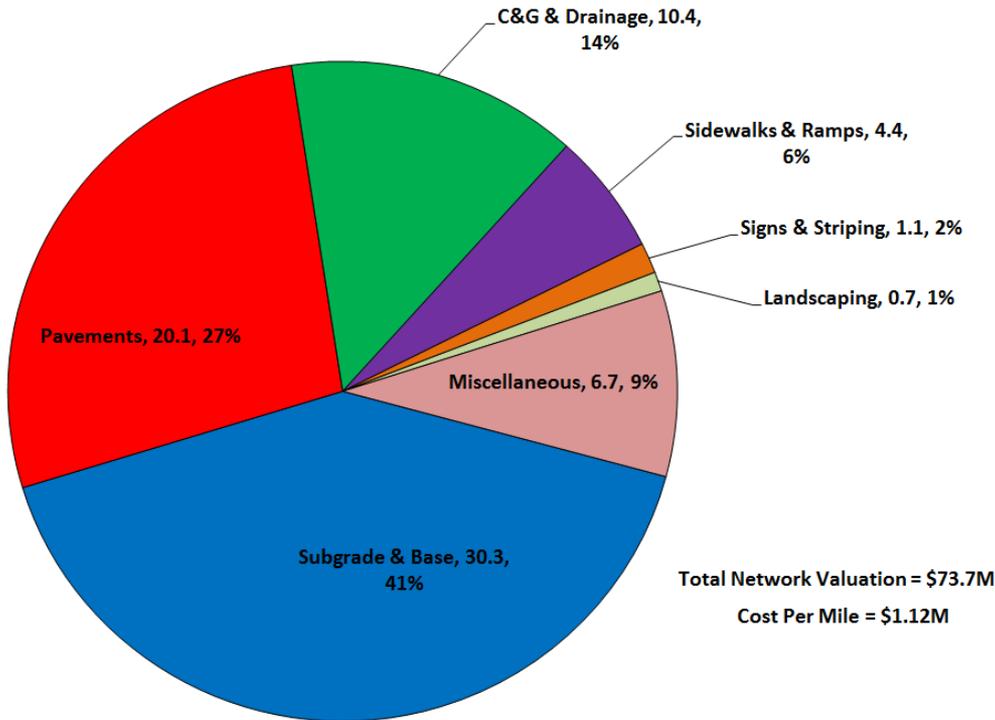


Stephen Smith, P.E., Project Principal  
IMS Infrastructure Management Services

# Scale of Investment....



City of Port Orchard, WA  
Network Valuation (Category, \$, %)

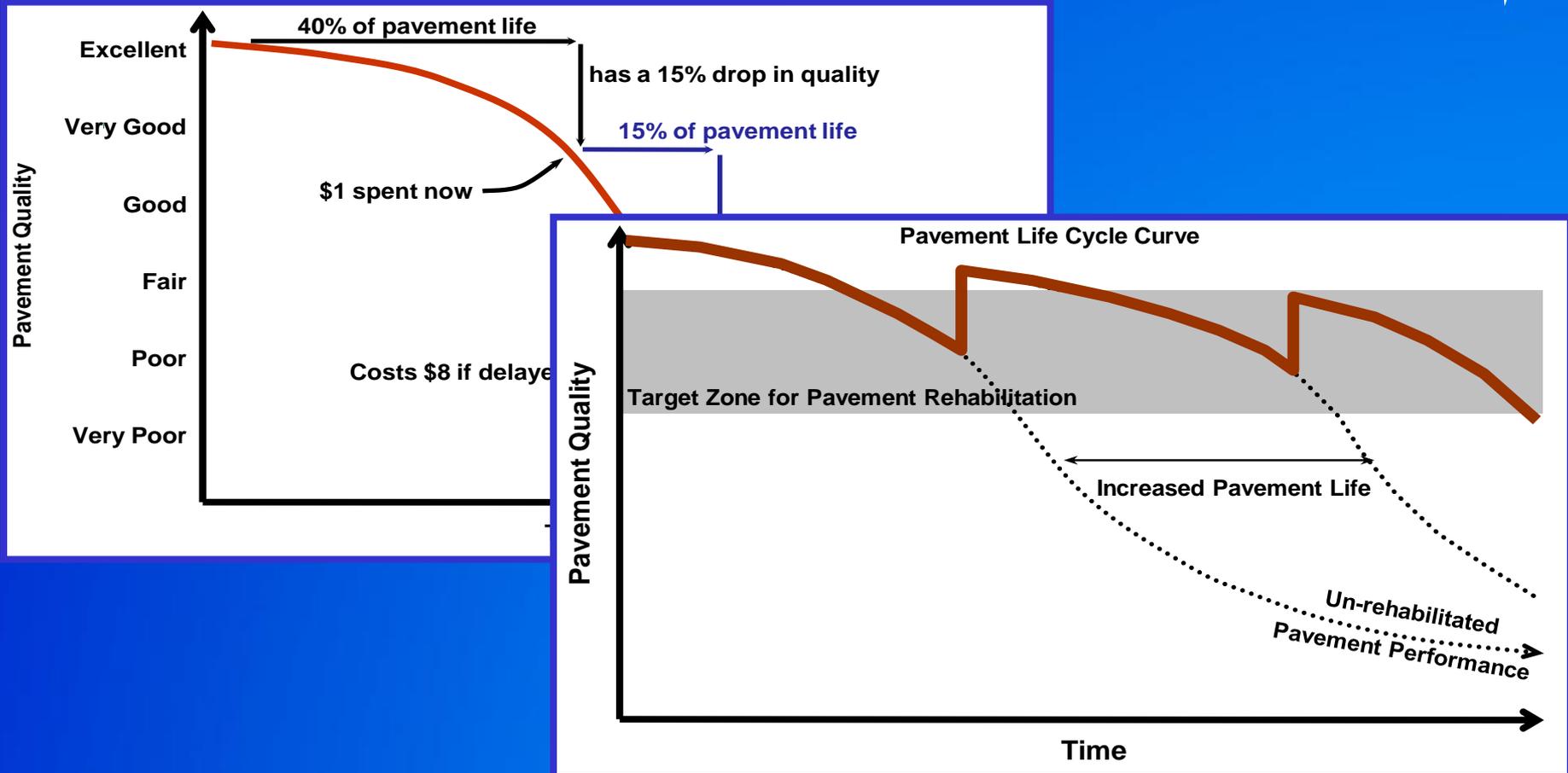


*~13,405 people*  
*~66 CL miles of City owned roadways*  
*1.2M square yards of pavement*

*Single largest City asset valued at*  
*\$1.12M/mile or \$73.7M total plus*  
*improvements and ROW*  
*(not including the value of land, bridges, etc.)*

*Early look at the condition score:*  
*PCI = 71 (Very Good)*  
*Back log = 6 % (target ≤ 10%)*  
*Rates as a solid A-*

# Why do Pavement Management?....



A pavement management system is a set of tools or methods that assist decision makers in finding optimum strategies for providing and maintaining pavements in a serviceable condition over a given time period

# *Concept of Pavement Management...*



# *Tools to Rate the Streets – Objective Surveys....*



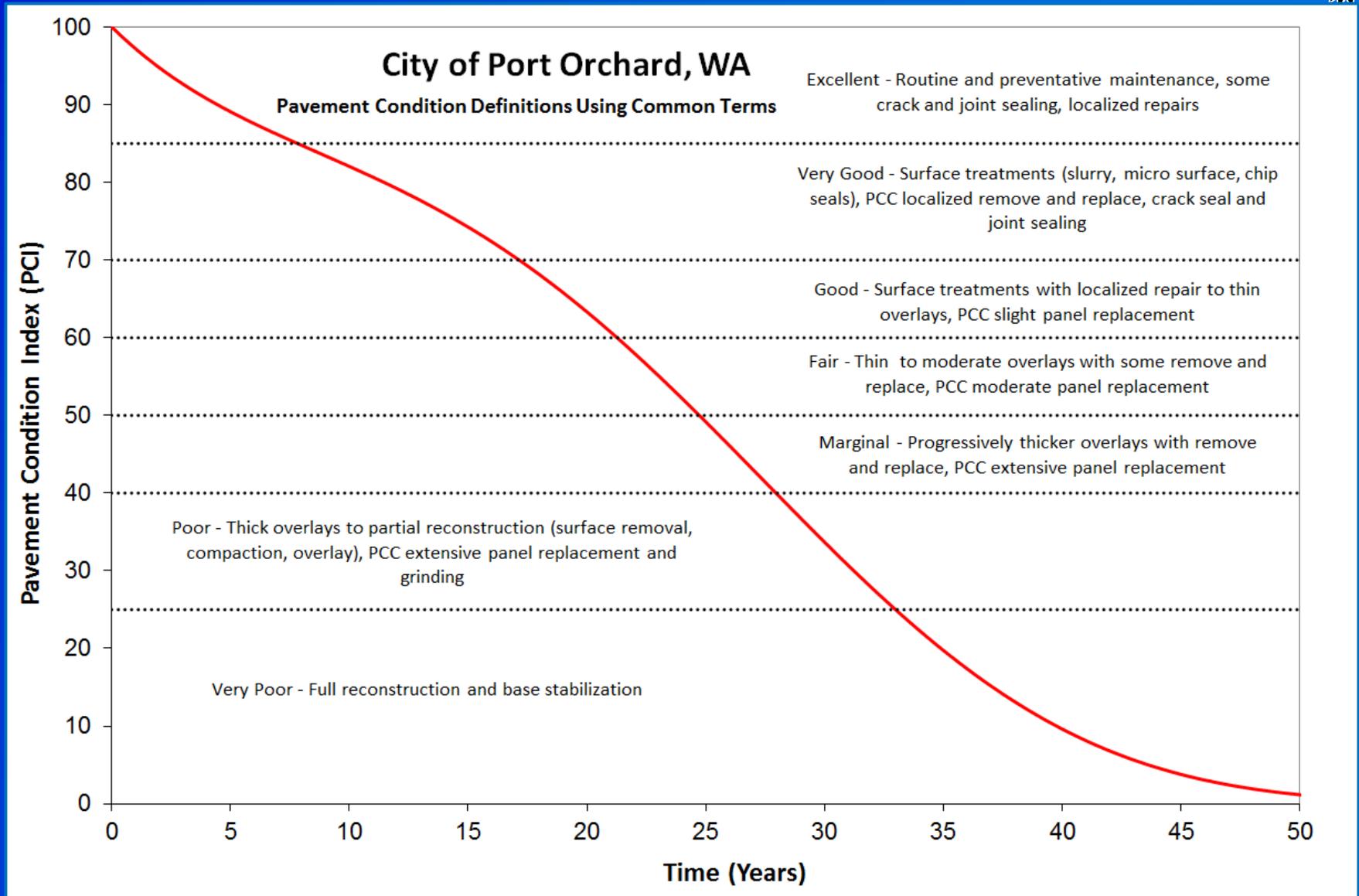
## **Condition Focuses On:**

**Roughness – Deterioration  
Pavement Strength (Arterials)  
Fatigue/Alligator Cracking  
Wheel Path Rutting  
Cracking  
Distortions & Weathering  
Patching & Potholes  
Raveling  
Divided/Shattered Slab  
Faulting  
Joint Spalling/Sealant Damage  
Corner Breaks/D Cracking  
Scaling**



**Prioritized  
Optimized  
Rehab Plan  
& Budget**

# Understanding the Pavement Condition Index....



# Understanding the PCI...Very Poor (0 – 25)



GISID: 828

Street Name: FLOWER AVE

SEGMENT\_ID: 6121

Image: ORCH004\_000538\_0013\_CF.jpg

RD\_LOG\_ID: 100



City of Port Orchard  
Est. 1890

**Base &/or Structural Failures**  
**Rutting**  
**Excessive Cracking**



GISID: 22

Street Name: SHERMAN AVE

Image: ORCH007\_000864\_0003\_CF.jpg



**Past point of overlay based rehabilitation and/or panel replacements.**

**Rehabs often driven by citizen complaints.**

**Safety becomes a concern at very low PCI.**

# Understanding the PCI...Poor to Marginal (25 – 50)



City of  
**Port Orchard**  
Est. 1890

GISID: 936  
Image: ORCH001\_000180\_0036\_CF.jpg

Street Name: CANYON CT

SEGMENT\_ID: 11484  
RD\_LOG\_ID: 100



CF IMS  
2016/06/24 16:45:28

**Localized base failures**  
**Rutting at intersections**  
**Extensive cracking**  
**Extensive patching**

GISID: 1675  
Image: ORCH007\_000826\_0008\_CF.jpg

Street Name: S FLOWER AVE



CF IMS  
2016/06/25 20:32:19

**Tired streets due for a thicker overlay, possibly a surface removal and replacement on ACP roads. Extensive joint, panel replacement, and grinding on PCC roads.**

**High priority to avoid reconstruction**

# Understanding the PCI...Fair (50 – 60)



GISID: 1548

Street Name: RETSIL RD SE

SEGMENT\_ID: 11753

Image: ORCH006\_000723\_0083\_CF.jpg

RD\_LOG\_ID: 100

**Progressive cracking**  
**Few base failures**  
**Localized distresses**



GISID: 1306

Street Name: PERRY AVE N

Image: ORCH002\_000331\_0082\_CF.jpg

**Optimum timing for thin – moderate overlay or moderate panel replacement on PCC roads.**

**Many benefits to selecting these streets: early lower cost – greater return, less grinding, drainage**



# Understanding the PCI...Good (60 - 70)



GISID: 1602

Street Name: POPLAR ST

SEGMENT\_ID: 13273

Image: ORCH007\_000772\_0037\_CF.jpg

RD\_LOG\_ID: 100



City of  
Port Orchard



## **Few localized distresses** **Minimal base failures**

Good candidate for slight panel replacement on PCC roads.  
If distressed due to loading on ACP roads, may need thin overlay, otherwise crack seal and surface treat (micro/chip seal/slurry).

## **Greatest cost benefit:**

Thinner strategies  
Less crown build-up  
Less intrusive rehab  
Maintain existing drainage

# Understanding the PCI...Very Good (70 - 85)



GISID: 3239

Street Name: BETHEL AVE

SEGMENT\_ID: 3161



City of  
Port Orchard

Est. 1890

Image: ORCH002\_000245\_0085\_CF.jpg

RD\_LOG\_ID: 100



**Very few distresses**  
**No rutting**  
**No base failures**

**Crack seal with surface treatment on asphalt roads.**  
**Joint reseal and localized rehab on concrete roads.**

**Maintains existing drainage.**  
**Extends pavement life at lowest cost**

2016/06/24 17:49:33

IMS

# Understanding the PCI...Excellent (85 - 100)



GISID: 1019

Street Name: PORT ORCHARD BLVD

SEGMENT\_ID: 9389

Image: ORCH001\_000043\_0029\_CF.jpg

RD\_LOG\_ID: 100



CF IMS  
2016/06/24 15:45:31

IMS

**Like new condition**  
**Very few minor distresses**  
**Smooth ride, good drainage**

GISID: 3245

Street Name: SW BAY ST

Image: ORCH002\_000262\_0016\_CF.jpg

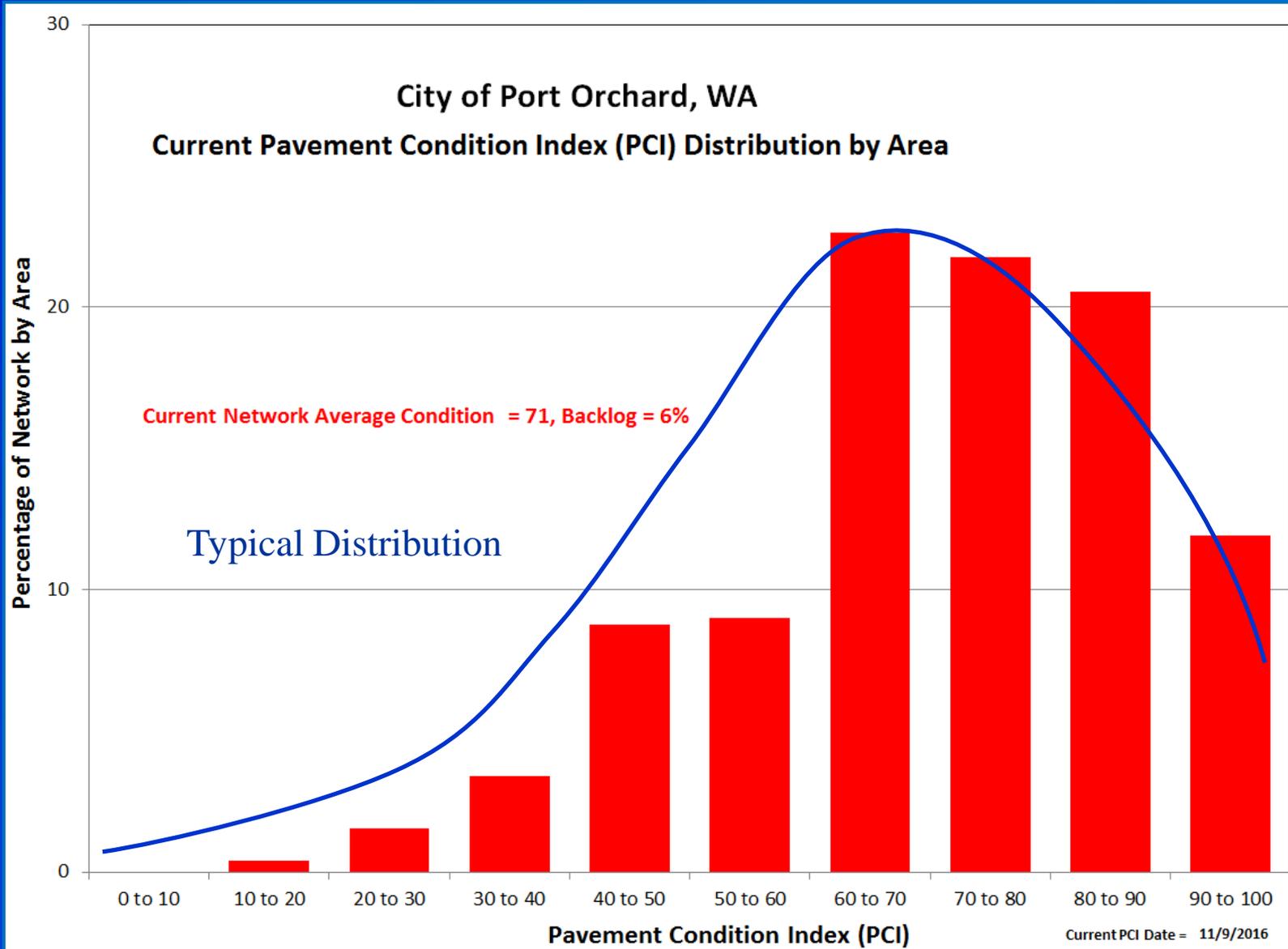


CF IMS  
2016/06/24 17:54:08

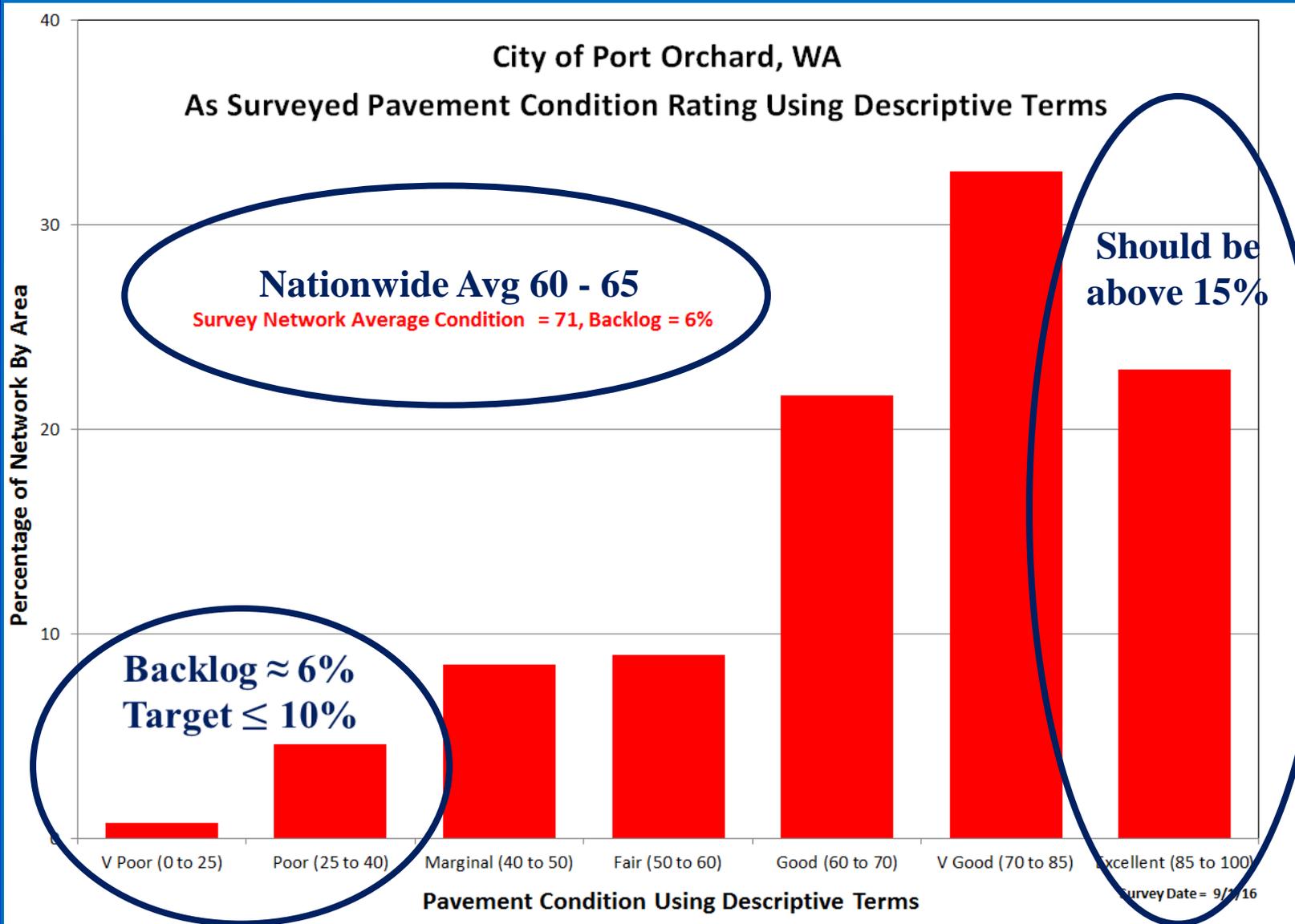
IMS

**Should provide 5 to 10 years  
prior to first rehabilitation  
with routine maintenance**

# Port Orchard PCI Results for 2016....



# Port Orchard Results... 3 metrics of health



Label Legend  
- GBID  
- Project ID

**Average Network PCI = 71**  
**Backlog of reconstruction = 6%**

### Key Areas of Concern

**Keeping the growth in Backlog as low as possible**  
**ADA transition only included on existing facilities**  
**Complete streets initiative not funded - drainage**  
**Many streets are very narrow – below standard for usage**  
**Low population density for mileage**

**Suggest a target PCI of  $\geq 71$**   
**Backlog of reconstruction  $\leq 10\%$**

#### Legend

- Centerline Endnodes
- Condition Rating
  - 0 - 25 Very Poor (red)
  - 25 - 40 Poor
  - 40 - 50 Marginal
  - 50 - 60 Fair (yellow)
  - 60 - 70 Good
  - 70 - 85 Very Good
  - 85 - 100 Excellent (green)

# *City of Port Orchard Methodology....*



1. Funding is not \$0, nor is it unlimited
2. Port Orchard places a value on its roadway network  
*Arterials – Collectors – Locals*
3. Identify annual budget to maintain current PCI & Backlog
  4. Examine effects of current funding levels
  5. Prevent deterioration in pavement quality
6. ADA compliance is included – but only on existing facilities
7. Pavement management is priority based, not worst-first
  8. No cost inflation
9. Complete streets not included in costs

# Port Orchard Annual Funding Estimates....



Estimate #3. - Based on Estimated Total Network Deficiency and Life Cycle Cost Estimate

Asphalt Deficiency	Total Cost (\$)	% of Total	Principal				Life Cycle (years)	Life Cycle Cost (\$)
			Arterial	Minor Arterial	Collector	Local		
Reconstruction (Base)	1,161,200	5.9	34,800	0	0	1,126,400	50	23,000
Reconstruction (Surface)	2,787,900	14.2	0	39,100	32,900	2,715,900	35	80,000
Thick Overlay (> 2.0 - 3.0)	4,177,400	21.2	185,800	993,400	161,100	2,837,100	20	209,000
Med Overlay (2.0 - 3.0)	2,202,000	16.8	176,000	625,000	485,100	2,015,900	17	184,000
Thin Overlay (< 2.0)	6,135,700	31.2	1,228,200	1,083,400	966,500	2,857,500	15	409,000
Surface Treatment	690,100	3.5	125,800	210,000	57,100	297,200	7	99,000
Slurry Seal	1,367,100	6.9	351,000	317,000	123,100	576,000	5	273,000
<b>Total Asphalt Network:</b>	<b>19,746,200</b>	<b>100</b>	<b>2,114,800</b>	<b>3,318,700</b>	<b>1,833,200</b>	<b>12,479,500</b>	<b>20</b>	<b>1,321,000</b>
PCC Reconstruction	0	0.0	0	0	0	0	75	0
PCC Partial Recon	0	0.0	0	0	0	0	50	0
Extensive Pnl Rplcmnt	0	0.0	0	0	0	0	25	0
Moderate Pnl Rplcmnt	3,000	5.2	0	0	0	3,000	20	0
Slight Pnl Rplcmnt	27,200	47.3	0	27,200	0	0	15	2,000
Localized Rehab	19,800	34.4	3,900	9,800	0	6,100	10	2,000
Joint Rehab	7,000	12.2	0	5,100	0	1,900	5	1,000
Routine Maintenance	500	0.9	0	0	0	500	2	0
<b>Total Concrete Network:</b>	<b>57,500</b>	<b>100</b>	<b>3,900</b>	<b>42,100</b>	<b>0</b>	<b>11,500</b>	<b>5,000</b>	<b>5,000</b>
<b>Total Network :</b>	<b>19,746,200</b>		<b>2,114,800</b>	<b>3,318,700</b>	<b>1,833,200</b>	<b>12,479,500</b>		<b>1,326,000</b>

Typical life cycle estimates show that Port Orchard would need approximately \$1.3M annually to maintain PCI (does not include routine maintenance activities, ADA compliance, culverts or ditch repair, signage, striping, bike lanes, or additional width)

# Port Orchard Rehabilitation Needs....

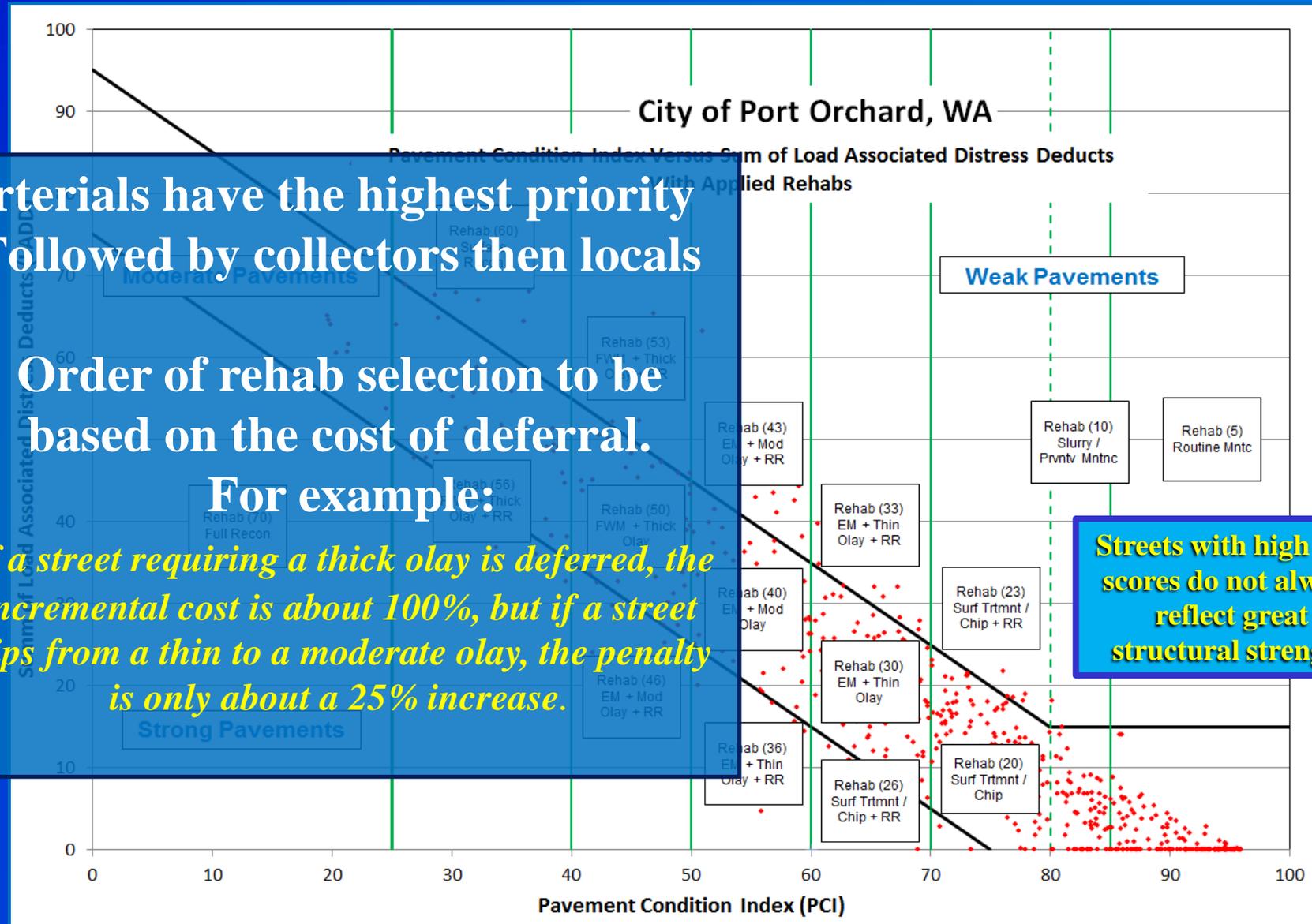


Arterials have the highest priority  
Followed by collectors then locals

Order of rehab selection to be  
based on the cost of deferral.

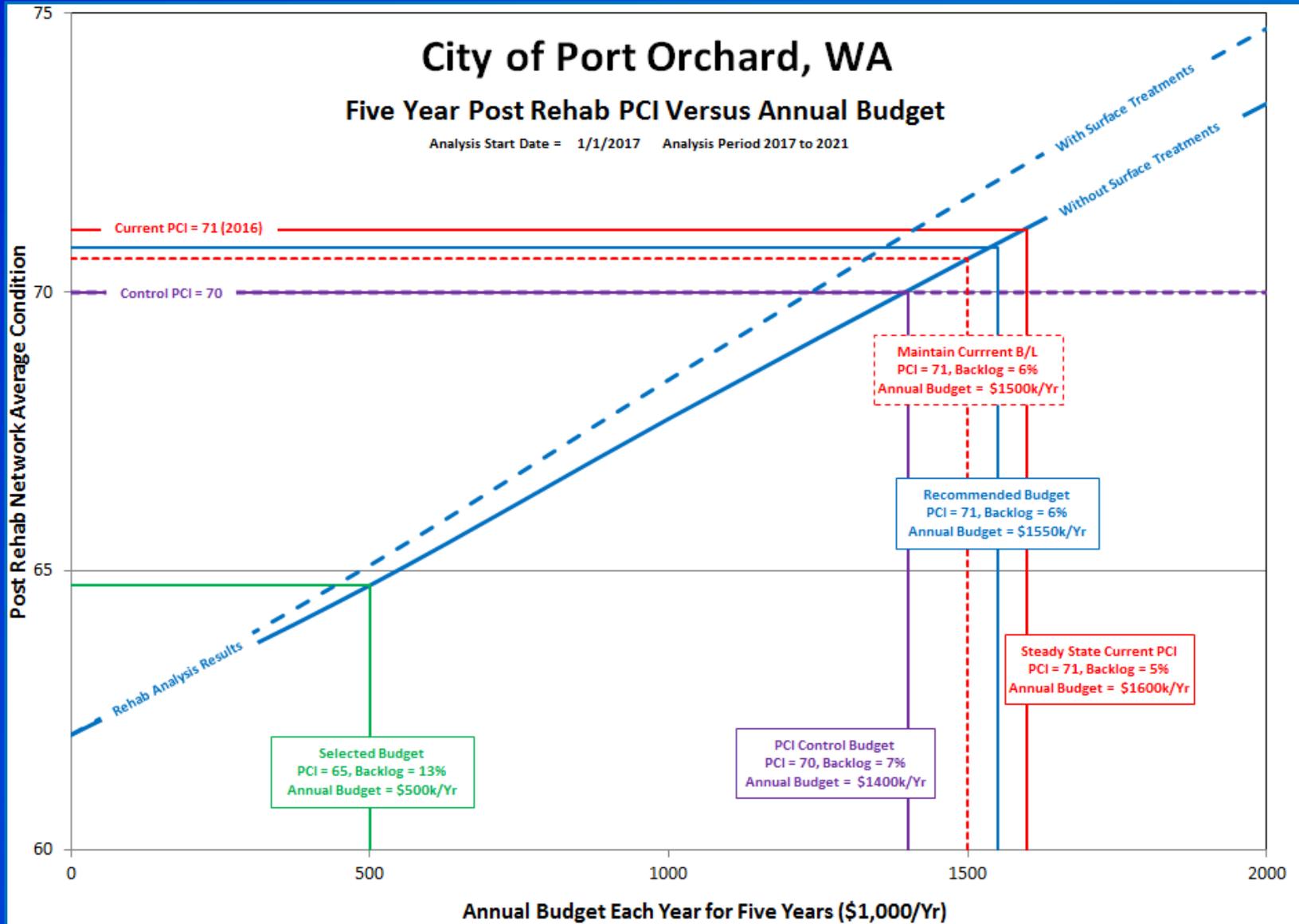
For example:

*if a street requiring a thick overlay is deferred, the incremental cost is about 100%, but if a street slips from a thin to a moderate overlay, the penalty is only about a 25% increase.*

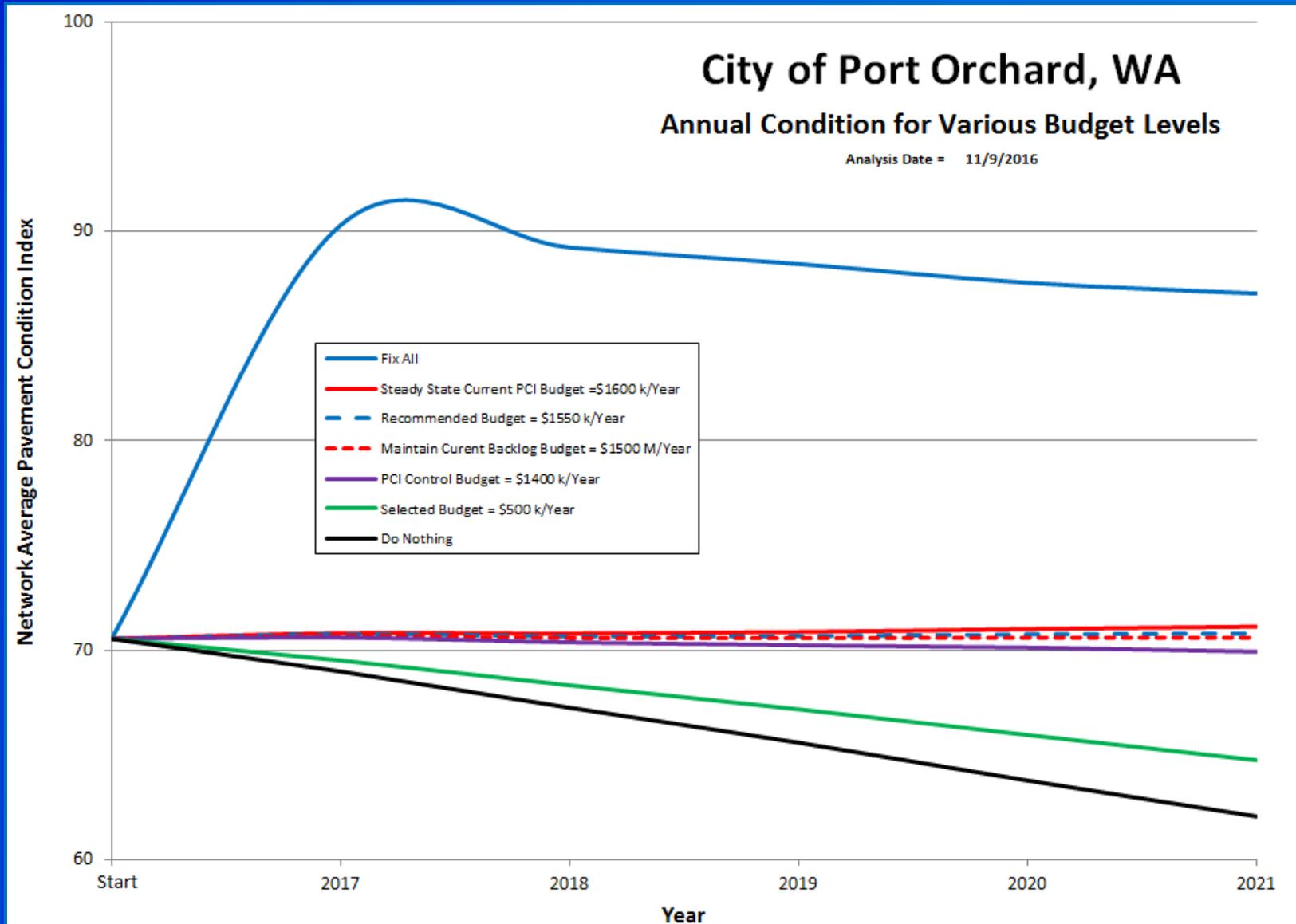


Streets with high PCI scores do not always reflect great structural strength

# Post Rehab PCI & Annual Funding....



# 5 Year PCI Budget Analysis....



# Equity Removal....



## City of Port Orchard, WA Equity Removal Summary

<b>Starting PCI:</b>	71	
<b>Fix All PCI:</b>	87	5 year post rehab PCI from Fix All budget
<b>PCI Increase:</b>	16	Fix All PCI less starting PCI
<b>Fix All Cost (\$):</b>	25,981,000	5 year fix all cost from Fix All budget
<b>Cost Per Point Increase (\$/pt)</b>	1,576,000	Fix all cost / PCI increase

### Equity Removal Based On PCI Restoration

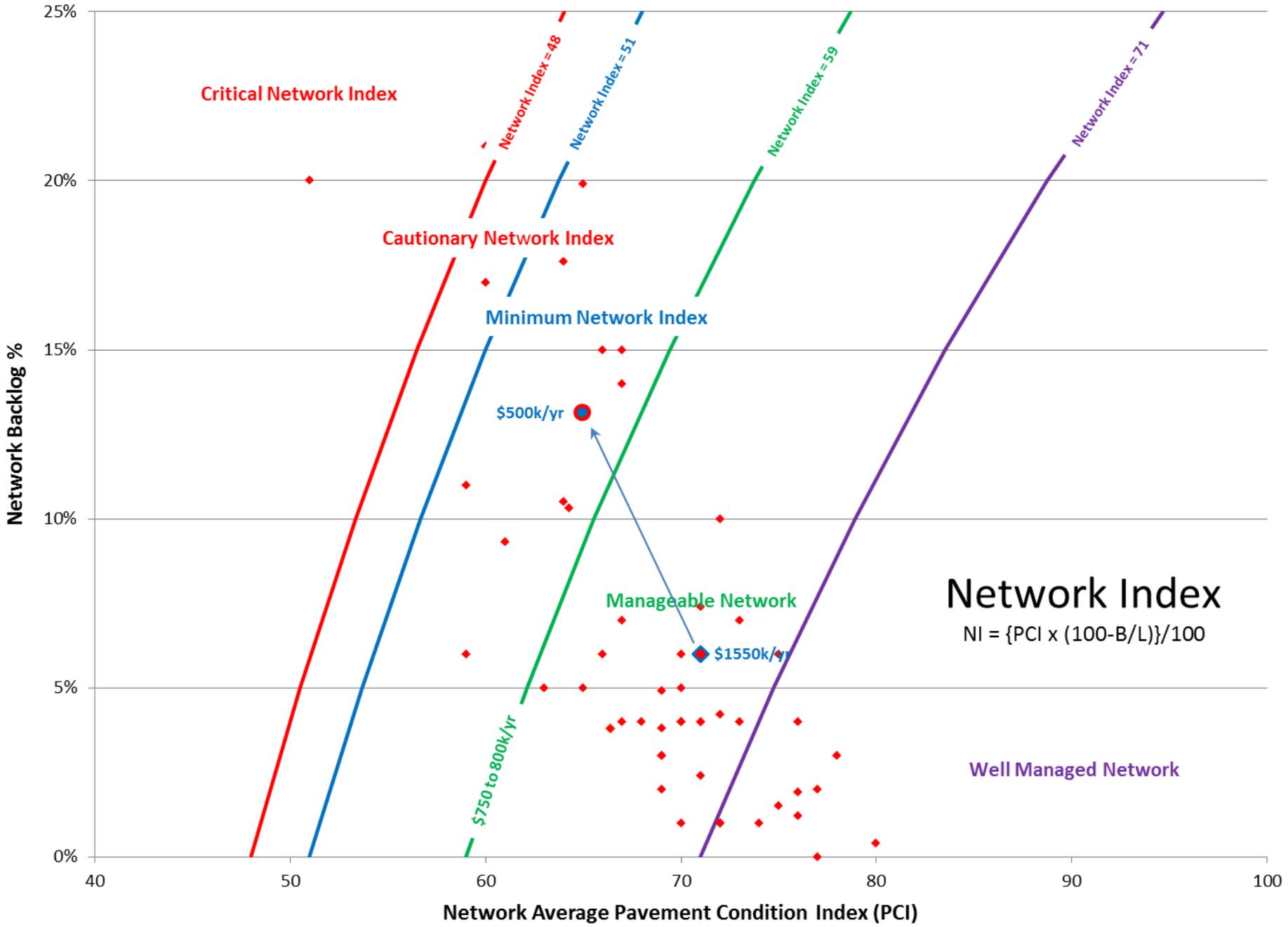
### For PCI Controlled Agencies

<b>Model:</b>	<b>Do Nothing</b>	<b>\$500k Annual</b>	<b>\$1000k Annual</b>	<b>Steady State</b>
<b>Annual Budget (\$k/Year):</b>	0	500	1000	1600
<b>Starting PCI</b>	71	71	71	71
<b>Final PCI</b>	62	65	68	71
<b>PCI Drop:</b>	8	6	3	0
<b>Cost to Replace Equity (\$):</b>	13,367,000	9,138,000	4,432,000	0
<b>5 Year Budget Expenditure (\$):</b>	0	2,500,000	5,000,000	8,000,000
<b>Total 5 Year Cost (\$):</b>	13,367,000	11,638,000	9,432,000	8,000,000
<b>Cost Over Steady State Budget (\$):</b>	5,367,000	3,638,000	1,432,000	0
<b>Additional Annual Cost Over Steady State (\$/year):</b>	<b>1,073,400</b>	<b>727,600</b>	<b>286,400</b>	<b>0</b>

# 5 Year PCI Budget Analysis....



Year	Miles	PCI	Backlog (%)	PVT Total (\$)	SW + G&G Total (\$)	ADA Total (\$)
2016	65.7	71	<b>5.8</b>	<b>16,045,830</b>	<b>2,233,910</b>	<b>434,000</b>
2017	2.3	71		1,217,270	299,280	21,000
2018	2.1	71		1,264,140	222,970	52,500
2019	2.5	70		1,317,860	195,090	31,500
2020	2.0	71		1,363,890	138,480	42,000
2021	2.3	71	<b>5.8</b>	1,290,840	242,630	14,000
	<b>11.2</b>	<b>70.5</b>	<b>5.8</b>	<b>6,454,000</b>	<b>1,098,450</b>	<b>161,000</b>



40

50

60

70

80

90

100

0%

5%

10%

15%

20%

25%

# *City of Port Orchard Recommendations....*



1. **Maintain PCI at or above 71 with a backlog below 6% for entire roadway network.**

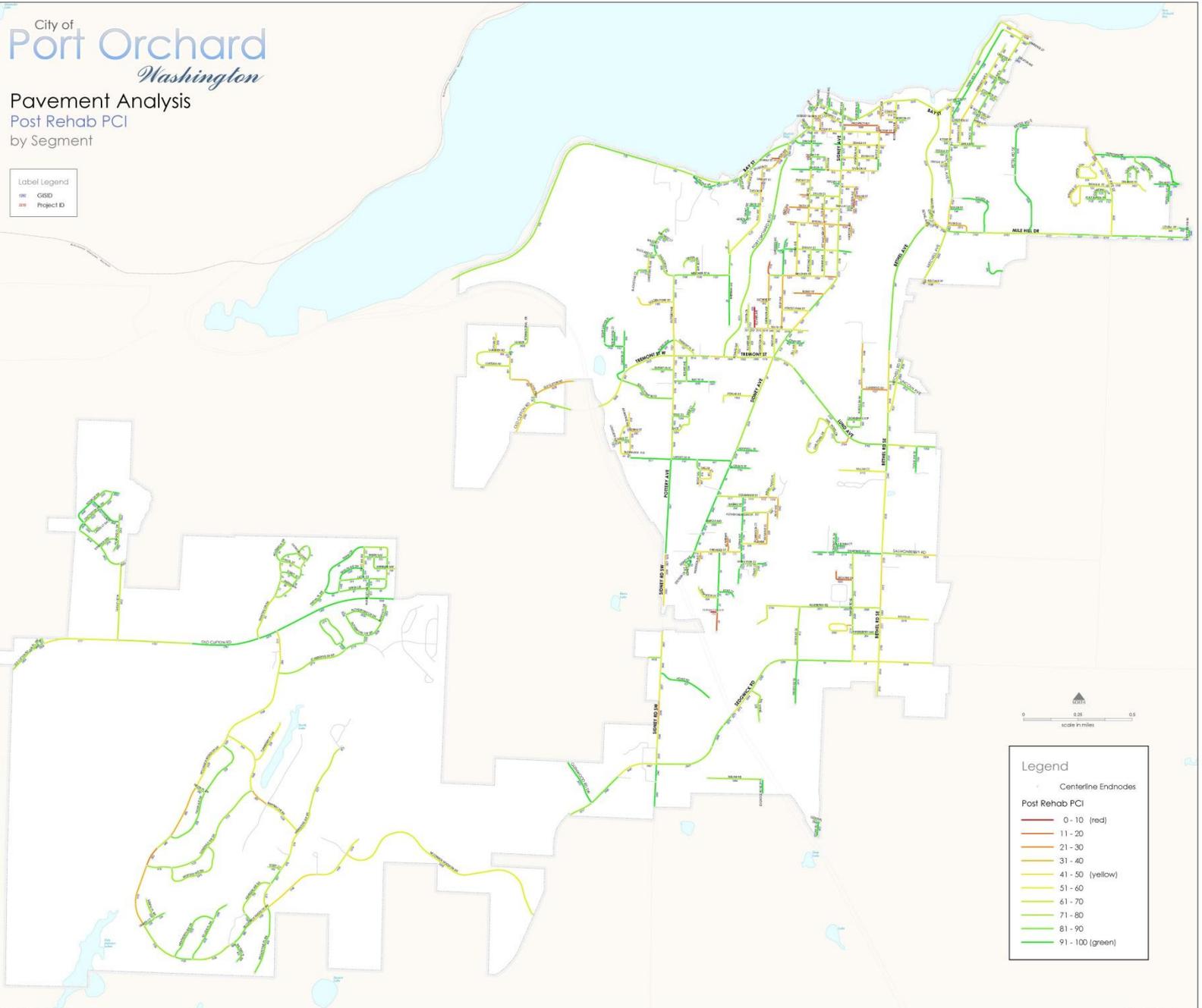
**A budget of \$1.55M will result in a network PCI of 71 and backlog of 6% over the next 5 years.**

2. **Use of a full suite of rehabilitation strategies reviewed on an annual basis.**
3. **Steady – effective rehabilitation and maintenance on an annual basis saves the City money over deferred maintenance.**
4. **City should resurvey their streets every few years to update the condition data and rehab program.**

City of  
**Port Orchard**  
*Washington*

**Pavement Analysis**  
Post Rehab PCI  
by Segment

Label Legend  
■ GSD  
■ Project ID



**Legend**

- Centerline Endnodes
- Post Rehab PCI**
- 0 - 10 (red)
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50 (yellow)
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100 (green)



# Questions?....

