

EXECUTIVE SUMMARY

Pavement Services, Inc. (PSI) produced this Pavement Management Report to establish a pavement management system and a baseline condition for the City of Veneta, OR street network. This report provides surface condition descriptions, reviews current treatment programs and costs, projects future treatment needs based on several funding scenarios, and provides a formulated multiyear maintenance and repair (M&R) project list.

The street network replacement cost is valued at approximately \$26 Million and represents a significant asset for the City to manage. This estimate is for the replacement of the roadway only and does not include any assets such as curbs, ADA ramps, or sidewalks. This asset is typically described in lane miles and/or centerline miles. Currently, the Veneta Public Works Department manages 21.5 centerline miles of asphalt concrete and gravel streets within the city limits. This report includes a breakdown of the street transportation system in terms of pavement type, level of improvement, and functional classification. Comparative statistical data are based on area (square feet).

In order to establish the baseline pavement condition, PSI staff collected the street condition data by conducting a walking inspection based on the procedure outlined in ASTM International D6433-11: *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys*. The Pavement Condition Index (PCI) rating was then generated using PAVER pavement management software (PMS). The PCI is a numerical indicator that rates the condition of the pavement. The scale ranges from zero to 100, where zero is the worst possible condition and 100 is the best possible condition. The PAVER analysis helps establish efficient treatment requirements and identify financial implications of various budget strategies. This PMS also provides street inventory and condition trends using the street condition information and street maintenance and rehabilitation (M&R) history.

The overall area weighted average condition of the Veneta street system is rated as 83 or “Good”. The PCI scale used was Good, Average, Fair, Poor, and Very Poor; where Good is from 100 to 81, Average is 80 to 66, Fair is 65 to 51, Poor is 50 to 36, and Very Poor is 35 to 0. The pavement condition distribution in Veneta is 73.5% Good, 11.6% Average, 8.6% Fair, 2.5% Poor, and 3.8% Very Poor. Figure 1 presents a map with the baseline street condition resulting from the 2014 PCI survey.

Depending on design life and preventive maintenance, the typical pavement condition trend is for a slight deterioration right after construction and then the deterioration levels off. The leveling off period is where the deterioration condition slows relative to time. The period of slower deterioration is when the majority of the desired condition, use, and life of the pavement occurs. At the end of the “leveling off” period, there is a transition point referred to as the critical PCI. After the critical PCI is reached, the pavement condition typically deteriorates more quickly into a poor condition state. An example of typical pavement deterioration is presented in Figure 2.

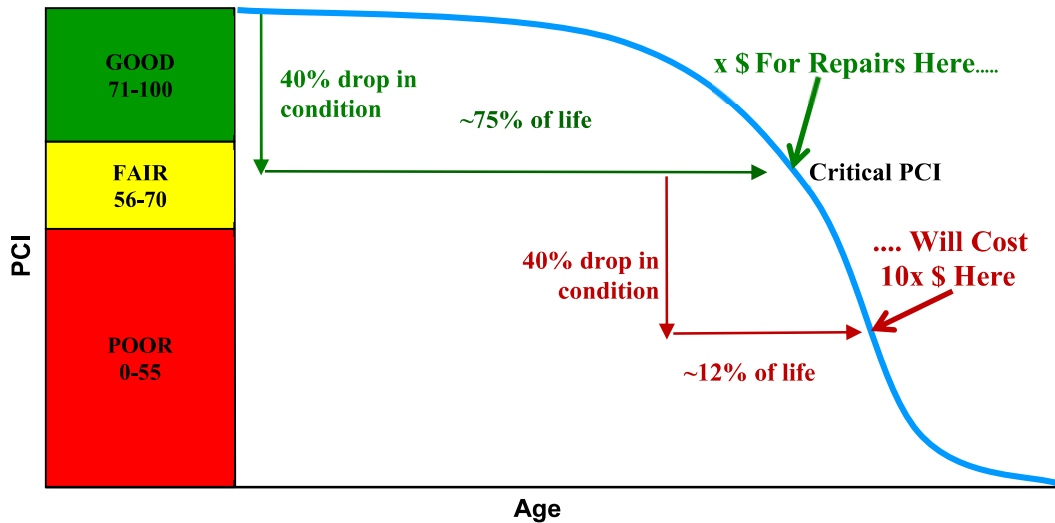


Figure 2 – Typical Pavement Deterioration Curve

Ideally, if preventive maintenance is performed before the critical PCI is reached, the life and use of the pavement can be extended in the leveling off period. Also, any major restoration work, such as overlay, that is done before a pavement deteriorates below the critical PCI usually costs substantially less than would be required if the rehabilitation work is delayed, due to the better condition of the pavement.

We understand that the City has no formal method of managing their pavement and is interested in determining the fiscal requirements necessary to eliminate the current level of unfunded maintenance and repair work as well as establish a proper method for maintaining their street network in the most cost effective manner.

Based on the 2014 pavement condition ratings, the City has a total of \$2.70 Million dollars in unfunded maintenance and repair, which included localized repairs, global maintenance such as surface treatments, and major M&R including overlays and reconstruction.

PSI analyzed four different budget scenarios based on either a specific budget requirement or a pavement condition constraint. Based on our analysis, we offer the following conclusions:

- Scenario 1. An annual expenditure of \$577K from 2015-2020 would eliminate the M&R backlog for the entire street system. The resulting funding needs from 2021-2025 would decrease to \$193K annually.
- Scenario 2. In order to stabilize the condition of the street system at the current PCI of 83, an annual budget of \$447K is required during the period of 2015-2020. At this level of investment, the unfunded M&R shrinks from \$2.70M to \$458K by year 2020.

Scenario 3. At the current funding level of \$325,000 annually, the unfunded M&R will reduce to \$1.42M by the year 2020.

Scenario 4. If only safety maintenance such as pothole filling is performed until 2020, the unfunded M&R will grow from \$2.70M to \$3.12M and the average PCI will drop from 83 to 73.

Figure 3 shows the effect of the four budget scenarios on the resulting condition of the Veneta street system.

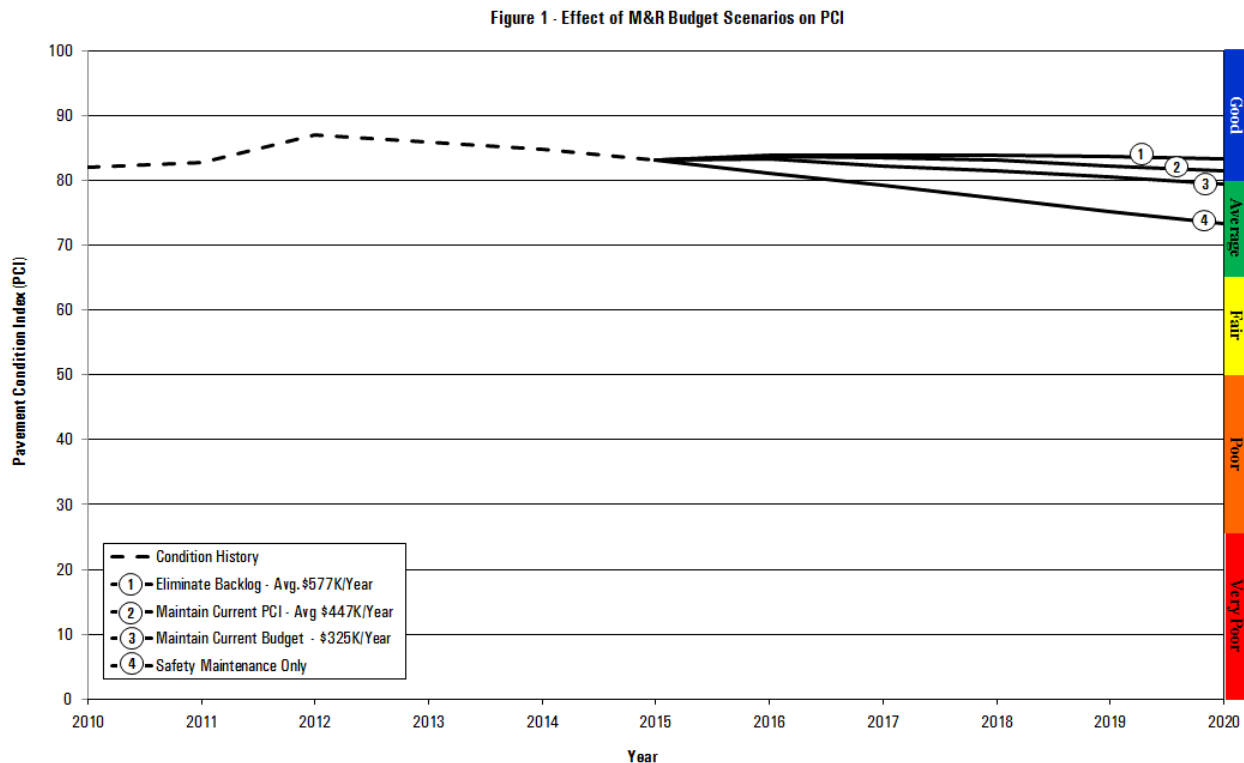
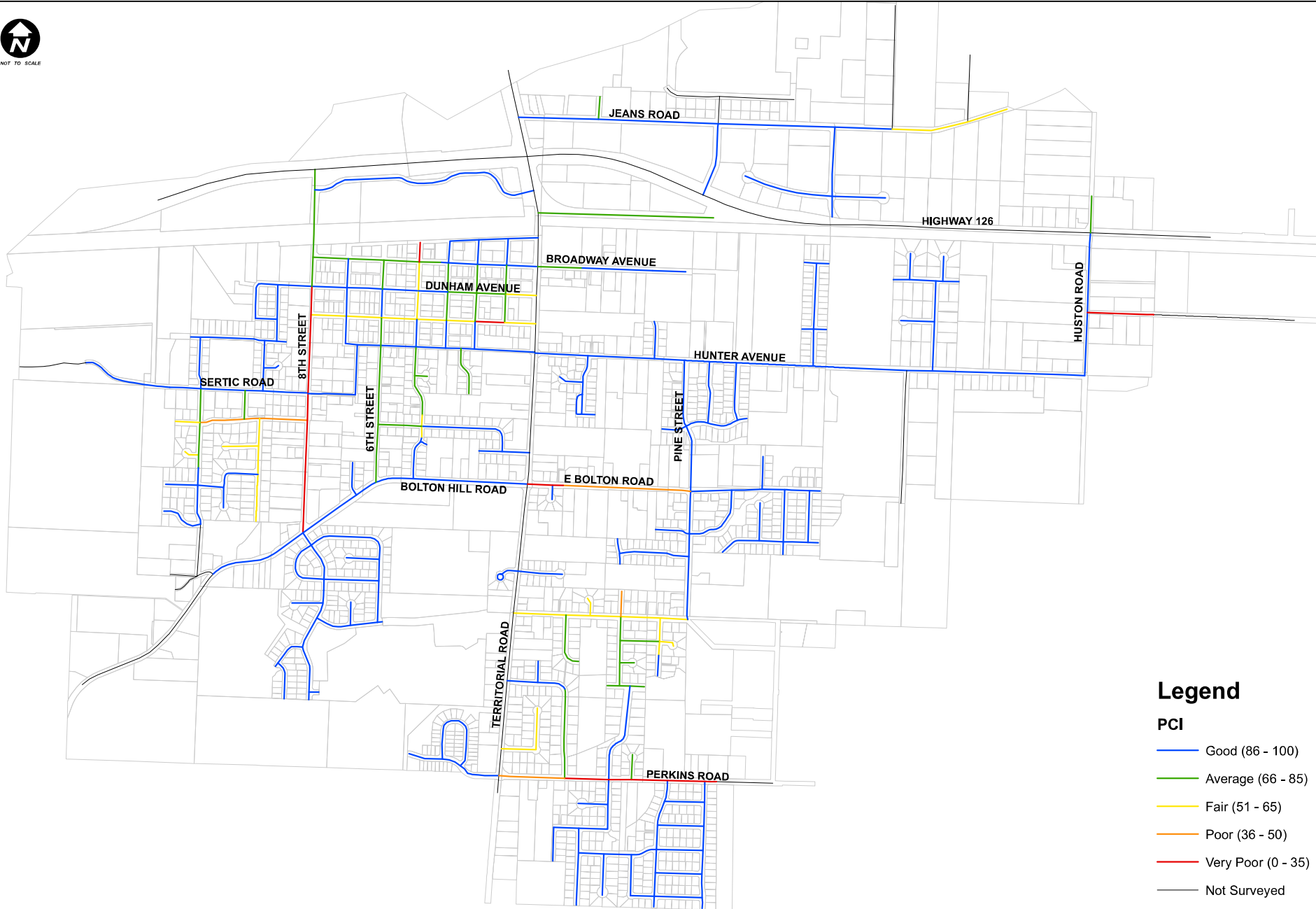


Figure 3 – Effects of Various Budget Scenarios on PCI



Legend

PCI

- Good (86 - 100)
- Average (66 - 85)
- Fair (51 - 65)
- Poor (36 - 50)
- Very Poor (0 - 35)
- Not Surveyed

FIGURE
1

**2014 PAVEMENT CONDITION INDEX
SURVEY RESULTS**
Veneta, Oregon



PAVEMENT SERVICES, INC.
INNOVATIVE PAVEMENT SOLUTIONS

Date: 01/29/2015

Job No: 14037

City Council Meeting

Pavement Management Study

February 9, 2015



Project Details

◆ Pavement Management Study

◆ Visual Survey

- ◆ Pavement Condition Index (PCI) Survey
- ◆ Sidewalk Inventory & Condition Assessment

◆ Budgetary Needs & Consequence Analysis

◆ Pavement Project Recommendations

◆ Veneta has 21.5 miles of paved streets

◆ Street Network Replacement Value is Approximately \$26 million



Pavement Management Study



Pavement Management Definition

▶ Network-Level:

A systematic approach to inventory the pavement network, analyze pavement performance, ensure optimum return on investment, meet agency requirements, and identify projects.

- ▶ **PAVER**
- ▶ **StreetSaver**
- ▶ **Cartegraph**

▶ Project-Level:

An in-depth pavement evaluation of a specific area. It includes the selection of M&R type(s), such as overlay or surface reconstruction, and layer thickness design based upon current structural condition and future traffic loading.

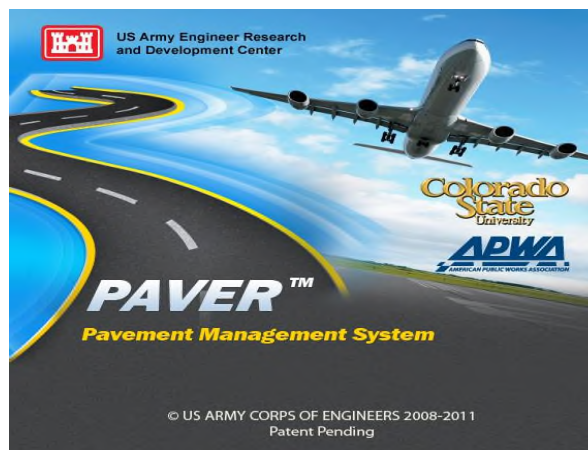
- ▶ **Structural Evaluation (Falling Weight Deflectometer Testing & Coring)**
- ▶ **Pavement Design**



Network Level Management

PAVER - Pavement Management System

- Originally was developed in the late 1970s to help the Department of Defense (DOD) manage M&R for its vast inventory of pavements.
- In the early 1980s PAVER became widely used by APWA, cities, counties, and airports.
- It uses inspection data and a pavement condition index (PCI) rating from 0 (failed) to 100 (excellent) for consistently describing a pavement's condition and for predicting its M&R needs many years into the future.



Network Level Management

PAVER - Pavement Management System

Capabilities:

- ◆ Develop and organize the pavement **inventory**
- ◆ Assess the current **condition** of pavements
- ◆ Develop models to **predict** future conditions
- ◆ Report on past and predict future pavement **performance**
- ◆ Develop scenarios for **Maintenance & Repair (M&R)** based on budget or condition requirements
- ◆ Plan **Projects**



Network Level Management

- ▶ Visual Surveys
 - ▶ Pavement Condition Assessment
 - ▶ Sidewalk Inventory and Condition Assessment

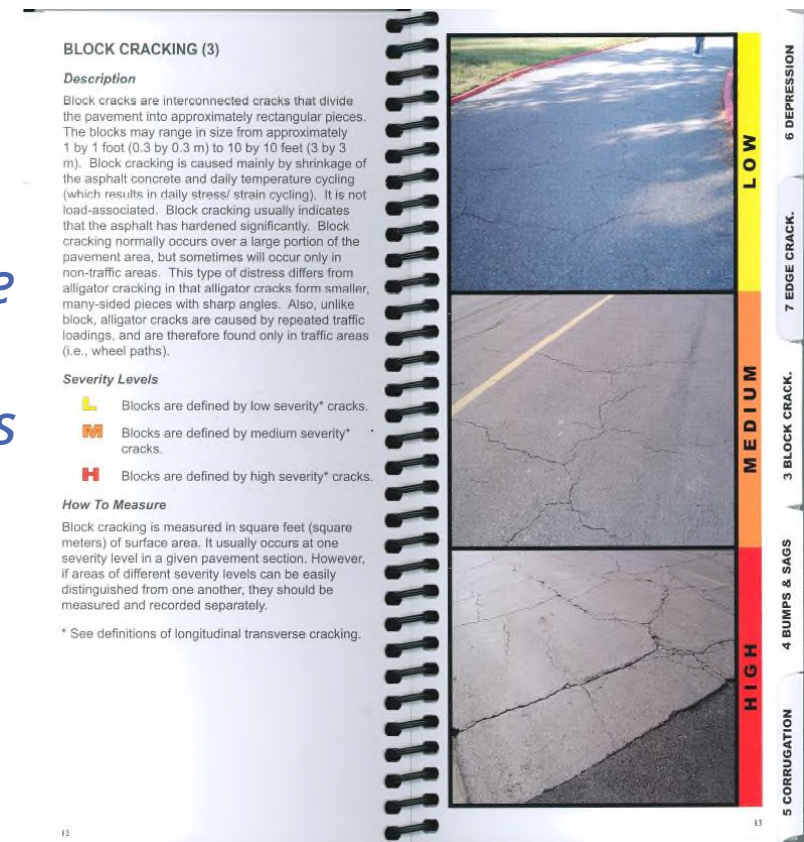


Pavement Inspection Procedure

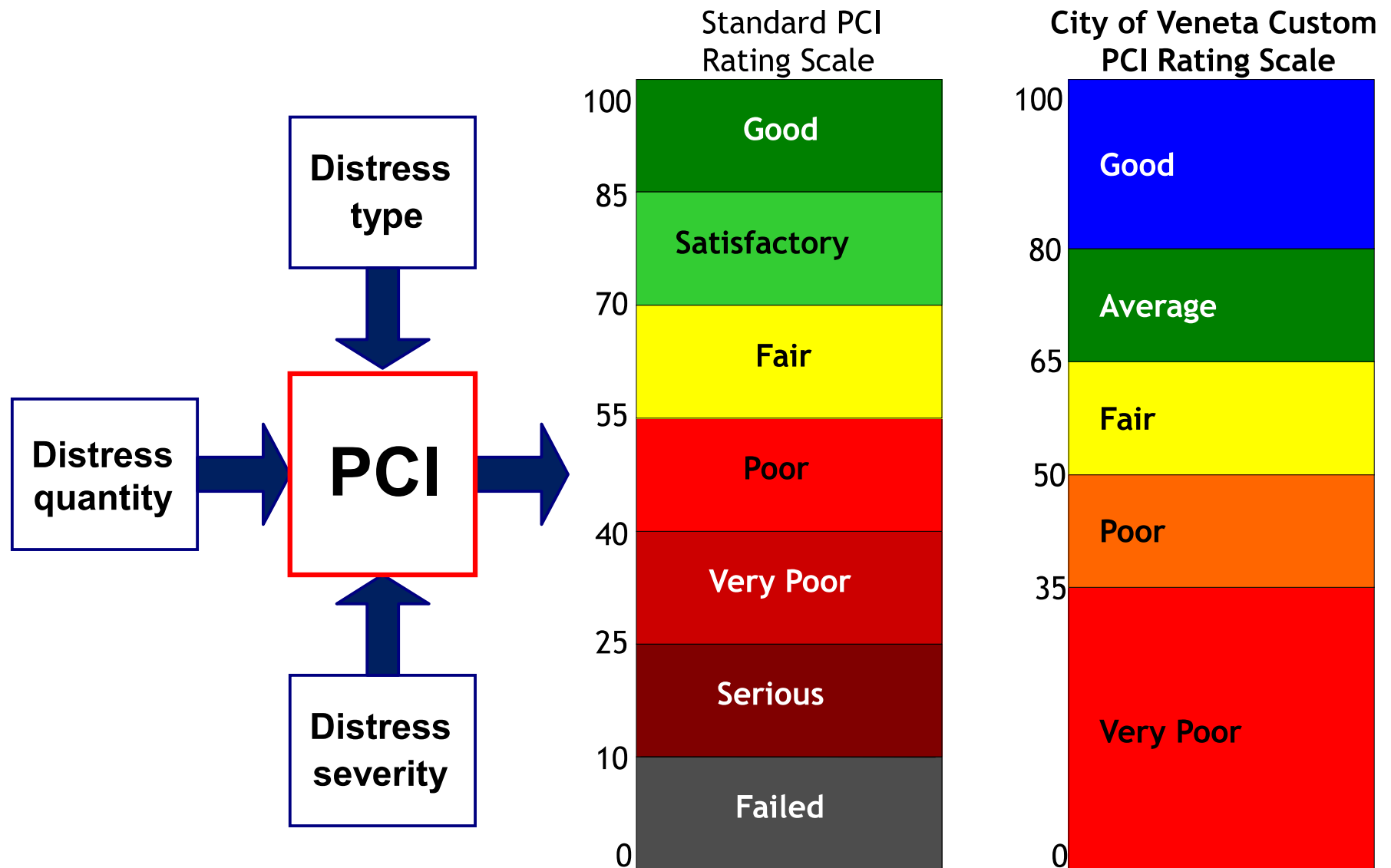
- ▶ Pavement Rating is the method of determining the pavement condition through visual observations.
 - ▶ Specifically, the type of distress/defect, the severity, and the quantity are recorded.

- ▶ PAVER Method

- ▶ *ASTM D6433-11: Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys*



Pavement Condition Index (PCI)

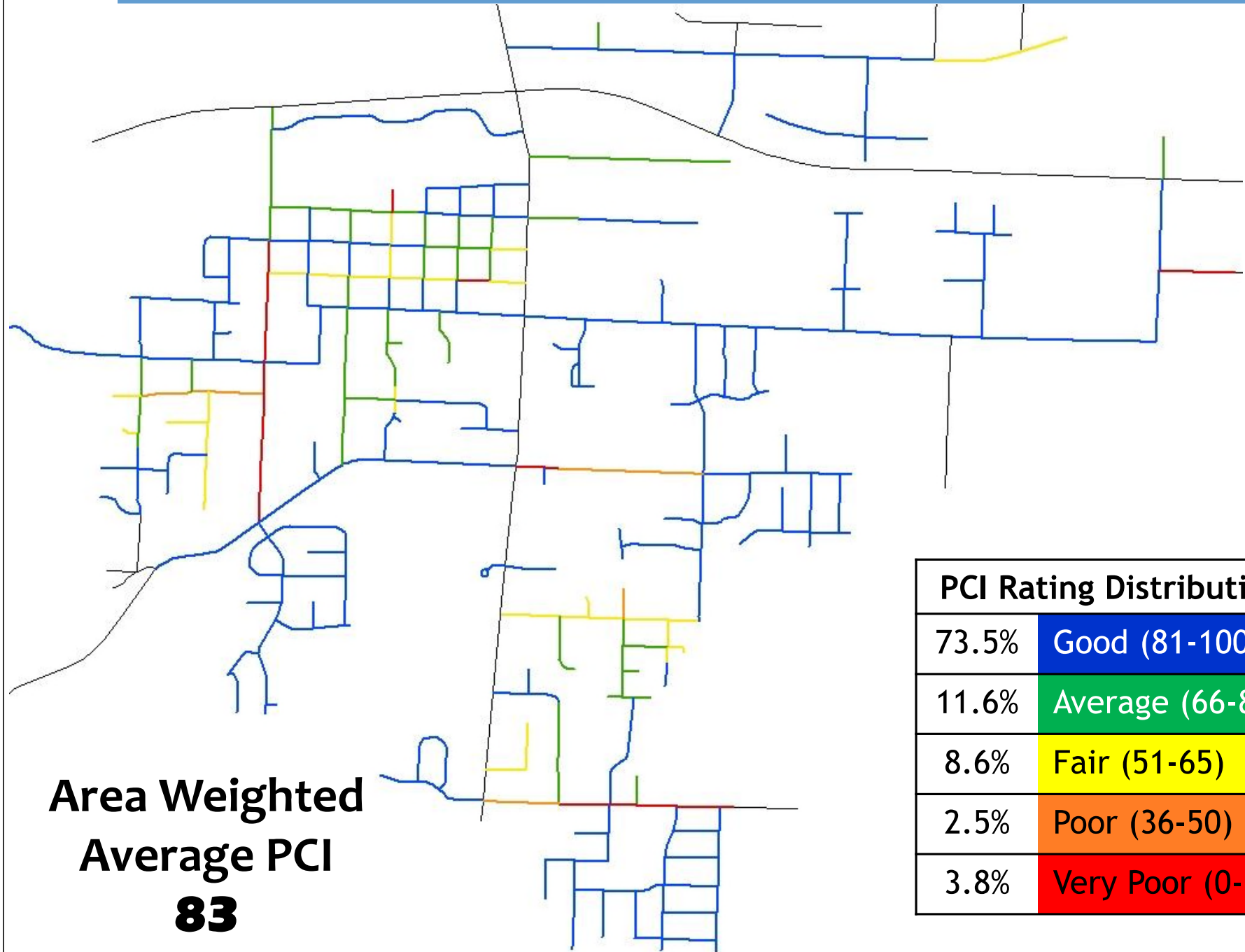


Benefits of Pavement Condition Index (PCI)

- ▶ What It Provides: The PCI tells public works officials
 - ▶ The current condition of the road network
 - ▶ The rate of deterioration of the road network over time
- ▶ Benefits of PCI within **PAVER** Pavement Management System:
 - ▶ Identify immediate maintenance and rehabilitation needs
 - ▶ Monitor pavement condition over time
 - ▶ Develop a network preventive maintenance strategy
 - ▶ Develop road maintenance budgets
 - ▶ Evaluate pavement materials and designs



2014 PCI Survey Results



Sidewalk Survey



inventoried sidewalk
on

- ▶ Inventoried sidewalk width
- ▶ Determined sidewalk condition
- ❖ Developed Condition Rating Criteria

Excellent Condition

- Uniform & Flat Cross Slope
- No Slab Faulting
- No Cracks
- No Obstacles



Good Condition

- Uniform & Flat Cross Slope
- No Slab Faulting
- Minimal Cracks < 1/4"
- No Obstacles



Fair Condition

- Slightly Non-Uniform Cross Slope
- Several Cracks > 1/4"
- Several Faulted Slabs or Obstacles

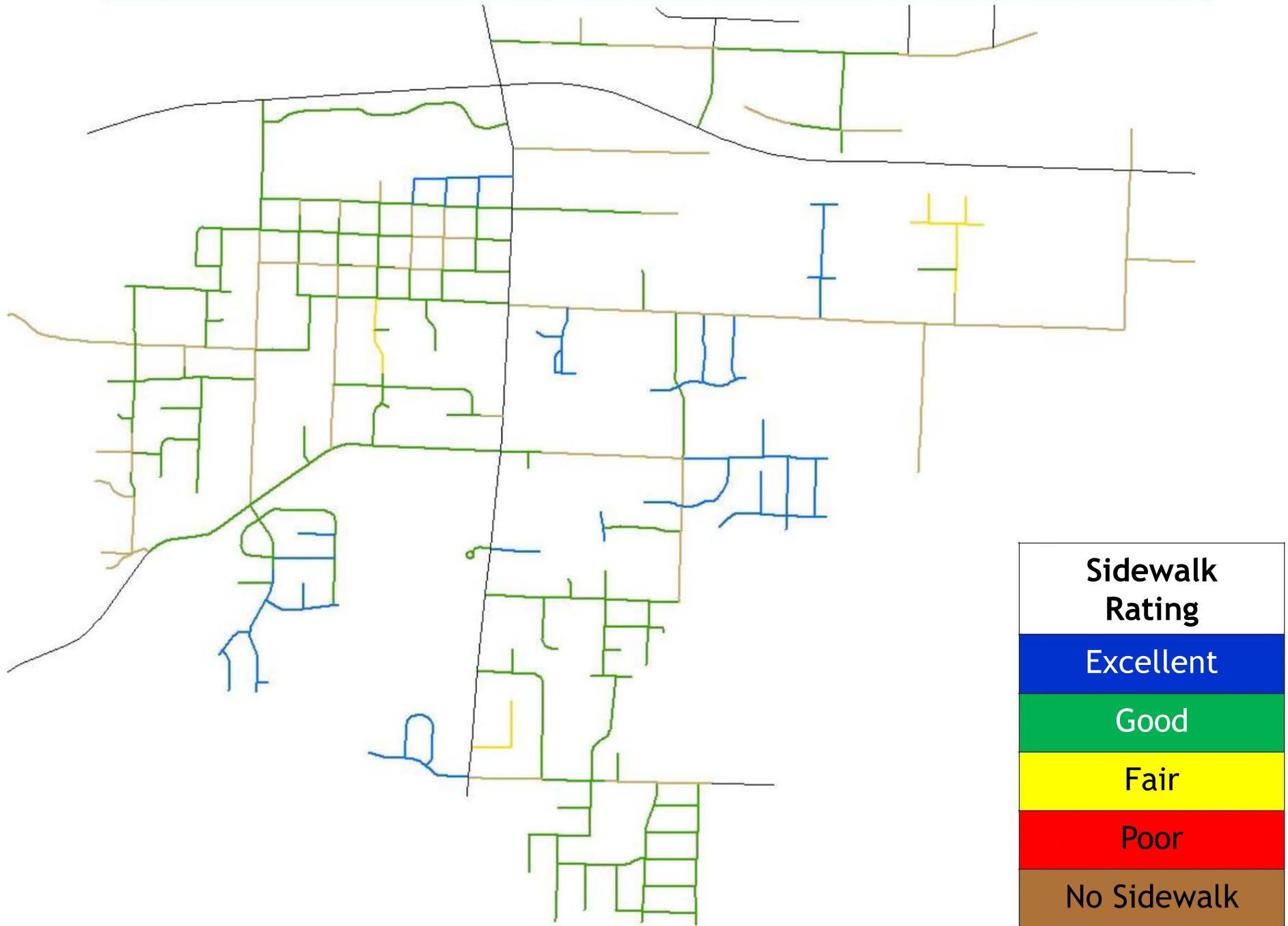


Poor Condition

- Non-Uniform Cross Slope
- Many Multi-Directional Cracks
- Missing Pieces of Concrete
- Significant Quantity of Faulted Slabs or Obstacles



Sidewalk Condition



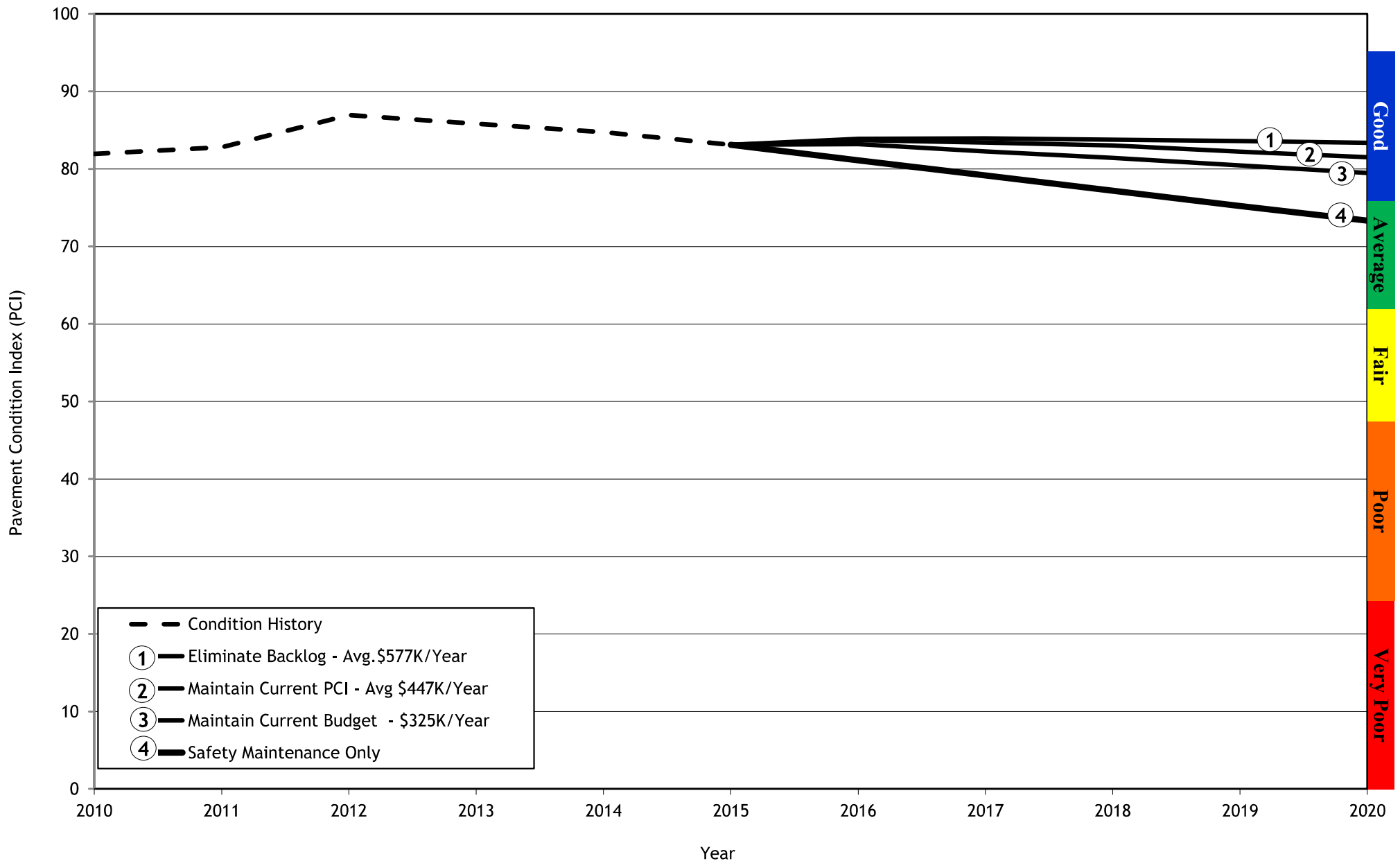
Budget Analysis & Maintenance & Repair (M&R) Work Planning

Budget Scenarios (2015 - 2020)

1. Eliminate Backlog by 2020
 - \$577,000/year
2. Maintain Current PCI
 - \$447,000/year
3. Maintain Current Budget
 - \$325,000/year
4. Safety Maintenance Only
 - \$45,000/year



Effect of M&R Budget on PCI



Analysis Results

	Budget Scenario	PCI at Beginning of Analysis	Funded M&R Cost Over Analysis Period ¹	Unfunded M&R Cost at End of Analysis ²	Total Cost ³	PCI at End of Analysis
1	Eliminate Backlog Avg. \$577K/Year	83	\$3,460,983	\$0	\$3,460,983	85
2	Maintain Current PCI Avg \$447K/Year	83	\$2,679,250	\$458,004	\$3,137,254	83
3	Maintain Current Budget \$325K/Year	83	\$1,878,631	\$1,414,032	\$3,292,663	80
4	Safety Maintenance Only	83	\$268,703	\$3,118,813	\$3,387,516	73

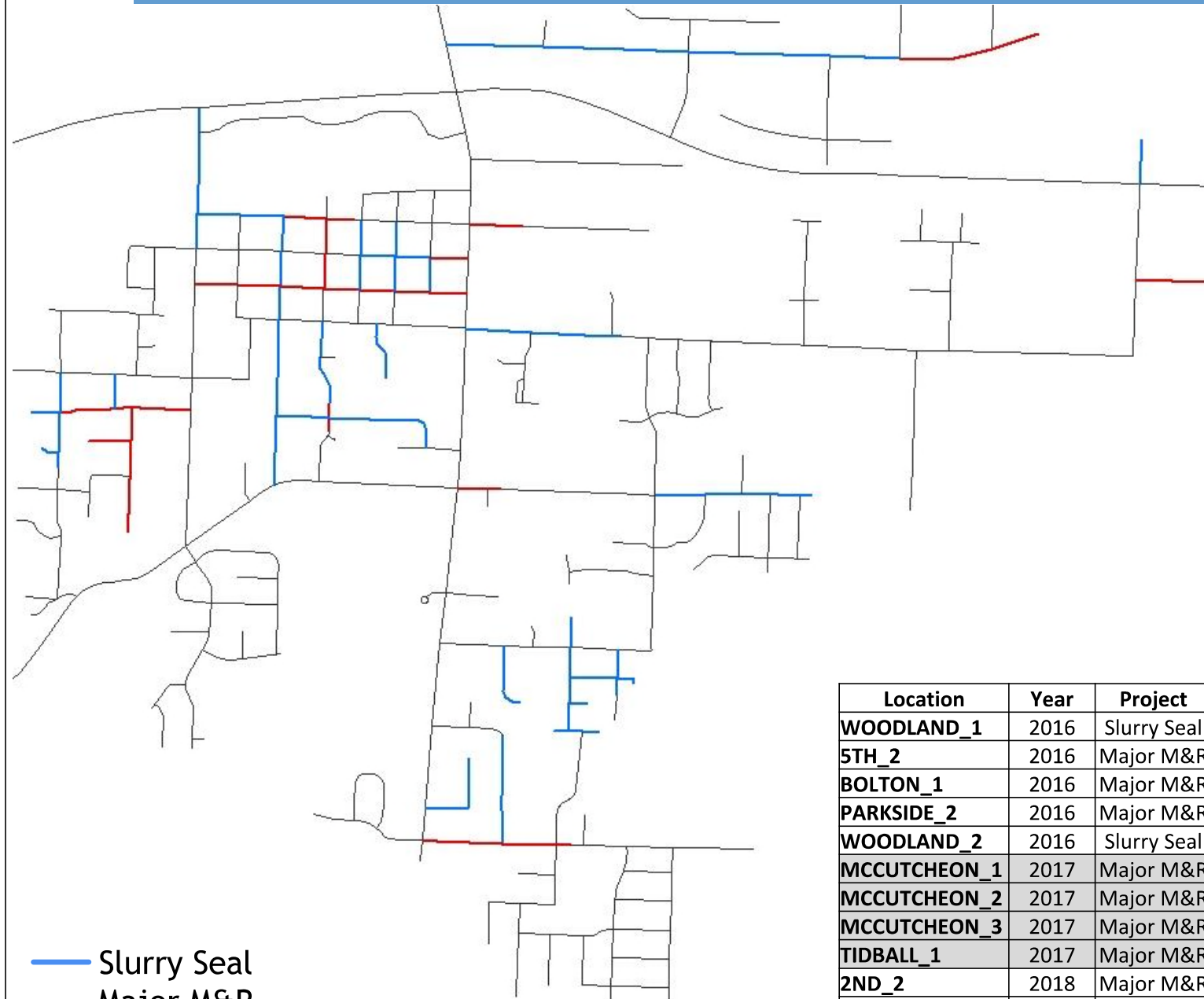
Notes: ¹Total Funding for the M&R budget scenarios. ²Total unfunded stopgap, preventive, global, and major M&R values. ³The sum of the total funded and total last year unfunded cost.

Recommendation:

- Increase yearly budget from \$325K to \$447K until 2023 the City will eliminate it's unfunded M&R



Project Development – Current Budget



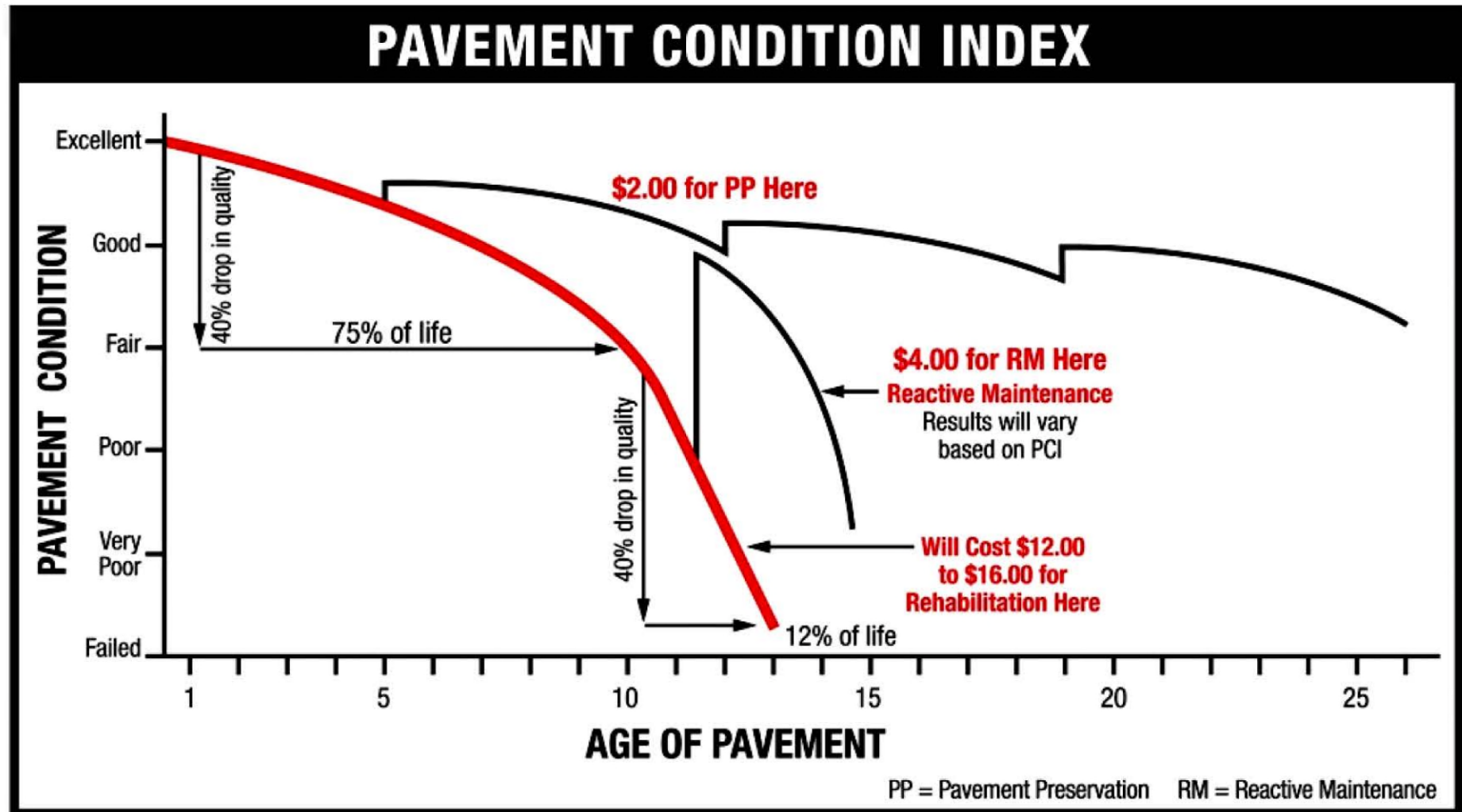
— Slurry Seal
— Major M&R

Project List

Location	Year	Project
10TH_2	2015	Slurry Seal
3RD_2	2015	Slurry Seal
3RD_3	2015	Slurry Seal
3RD_5	2015	Slurry Seal
4TH_2	2015	Slurry Seal
5TH_4	2015	Slurry Seal
5TH_5	2015	Major M&R
6TH_1	2015	Slurry Seal
6TH_2	2015	Slurry Seal
6TH_3	2015	Slurry Seal
8TH_1	2015	Slurry Seal
8TH_2	2015	Slurry Seal
9TH_4	2015	Slurry Seal
ACORN_1	2015	Slurry Seal
BERRY_1	2015	Slurry Seal
BERRY_2	2015	Slurry Seal
BLEK_2	2015	Slurry Seal
BROADWAY_1	2015	Slurry Seal
BROADWAY_2	2015	Major M&R
BROADWAY_5	2015	Major M&R
CHERRY_1	2015	Slurry Seal
DUNHAM_5	2015	Slurry Seal
FOREST_1	2015	Slurry Seal
HUNTER_4	2015	Slurry Seal
HUSTON_1	2015	Slurry Seal
JEANS_1	2015	Slurry Seal
NORMAN_1	2015	Slurry Seal
OAK_ISLAND_2	2015	Slurry Seal
OAK_ISLAND_3	2015	Slurry Seal
PARKSIDE_1	2015	Slurry Seal
PONDEROSA_1	2015	Slurry Seal
TERITORIAL_1	2015	Slurry Seal
TODD_3	2015	Slurry Seal
TRINITY_1	2015	Slurry Seal

Location	Year	Project
WOODLAND_1	2016	Slurry Seal
5TH_2	2016	Major M&R
BOLTON_1	2016	Major M&R
PARKSIDE_2	2016	Major M&R
WOODLAND_2	2016	Slurry Seal
MCCUTCHEON_1	2017	Major M&R
MCCUTCHEON_2	2017	Major M&R
MCCUTCHEON_3	2017	Major M&R
TIDBALL_1	2017	Major M&R
2ND_2	2018	Major M&R
9TH_5	2018	Major M&R
JEANS_2	2018	Major M&R
8TH_3	2019	Major M&R
PERKINS_2	2020	Major M&R
PERKINS_3	2020	Major M&R

Benefits of Knowing your Network



THANK YOU

