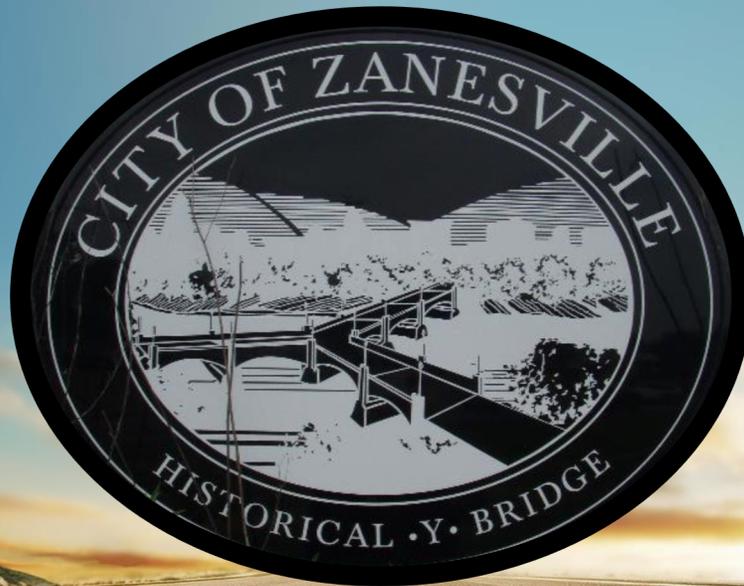




PAVEMENT MANAGEMENT **SIMPLIFIED**

**FINAL PROJECT REPORT**  
**PAVEMENT MANAGEMENT PROJECT**

City of Zanesville OH  
October 15, 2015



## EXECUTIVE SUMMARY

JG3 CONSULTING, LLC (JG3) was contracted by the City of Zanesville to provide a pavement management assessment and condition rating to implement using the PAVERTM system platform.

The scope of the project was as follows:

- Define the roadway network inventory
- Identify representative sample locations for inspection
- Identify all distress types, severity levels and quantities within each sample through ASTM D6433-11
- Provide a digital photo of each sample location
- Calculate the PCI for each pavement section
- Provide a complete inventory and condition listing of each pavement section
- Link all pavement management data to GIS base map
- Provide a final report of findings
- Provide continued support services

## PAVEMENT NETWORK SUMMARY

- 133 Centerline miles
- 306 Lane miles
- 19,410,817 Square feet
- 1,538 Management sections

## CURRENT CONDITION SUMMARY

After updating the pavement management database with the most recent work history and ASTM D6433 inspections, the current average PCI for the City of Zanesville roadway pavement network is a **58**. This classifies the roadway pavement network as being in “**Fair**” overall condition.

## PURPOSE

The City of Zanesville will use the PAVERTM Pavement Management Software (PMS) to aid in cost-effective decisions related to the roadway network, maximizing the return on investment from available maintenance and rehabilitation funds; generating a prioritized plan; and identifying specific areas in need of maintenance and rehabilitation. The services of JG3 help the City of Zanesville to realize goals through pavement management consulting as well as an accurate and objective ASTM D6433 inspection for all management sections within the roadway network. This report will identify the project scope, define the Pavement Condition Index (PCI), outline the ASTM D6433 inspection process followed and provide detailed condition analysis about the roadway pavement network.

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	1
PAVEMENT NETWORK SUMMARY.....	1
CURRENT CONDITION SUMMARY.....	1
PURPOSE .....	1
INTRODUCTION .....	3
ASTM INSPECTION PROCESS .....	3
SAMPLE DEFINITION .....	3
DISTRESS DEFINITION.....	3
PCI AND CONDITION CATEGORY DEFINITION.....	4
NETWORK CONDITION RESULTS.....	5
NETWORK CONDITION MAP.....	7
AREA CONDITION COMPARISON .....	8
DIGITAL IMAGES .....	8
DIGITAL IMAGES – EXCELLENT CONDITION CATEGORY .....	9
DIGITAL IMAGES – VERY GOOD CONDITION CATEGORY.....	10
DIGITAL IMAGES – GOOD CONDITION CATEGORY .....	11
DIGITAL IMAGES – FAIR CONDITION CATEGORY .....	12
DIGITAL IMAGES – POOR CONDITION CATEGORY .....	13
DIGITAL IMAGES – VERY POOR CONDITION CATEGORY .....	14
DIGITAL IMAGES – FAILED CONDITION CATEGORY .....	15
CONCLUSION .....	16

## INTRODUCTION

JG3 was contracted by the City of Zanesville to provide continuing pavement management services for their 133 centerline mile (306 lane mile) roadway network. Through these services a field inventory review and inspection was performed on all 1,538 management sections within the network. All inventory changes were updated within their current PMS database and an updated PCI was calculated for each section. Digital images were taken at each sample location to provide visual documentation and record of the inspection. This report provides a thorough definition of the inspection process performed as well as the condition results of our project.

## ASTM INSPECTION PROCESS

The PAVER™ PMS defines the pavement network in terms of “Branches” and “Sections”. The City of Zanesville Roadways Network consists of all maintained roadways within the agency, each roadway broken down into management sections on a block by block basis.

Within each management section, the total number of possible sample locations is first determined, and then approximately 10% of these samples are inspected following ASTM D6433. The trained inspector exits the vehicle, walks the sample area and identifies all distress information for that sample. The information is then recorded into the PAVER™ database for Pavement Condition Index (PCI) calculation. The final result is a PCI score for each management section.

### SAMPLE DEFINITION

Following ASTM D6433-11 a sample unit size must be between 1,000 and 3,500 sf for proper PCI calculation. To maintain consistent procedure, each sample size was determined to be 100’ long x the width of the pavement section. In the event that the section width was over 35’ wide, the sample size was half the width x 100’. In the event that the section area was less than 1,000 sf in area size, the entire section was sampled.

### DISTRESS DEFINITION

There are 20 possible distress types that can occur within asphalt based surfaces and 19 possible distress types that can occur within a concrete surface. The U.S. Army Corps of Engineers publishes the Asphalt and Concrete Surfaced Roads and Parking Lots Inspection Manuals. These manuals provide a description of each distress type, the criteria to determine each severity level (low, medium, high) and how to measure each. The asphalt distress types are outlined in Figure 1. And the concrete distress types are outlined in Figure 2.

01 – Alligator Cracking	06 – Depression	11 – Patch/Utility Cut	16 – Shoving
02 – Bleeding	07 – Edge Cracking	12 – Polished Aggregate	17 – Slippage Cracking
03 – Block Cracking	08 – Joint Reflection	13 – Pothole	18 – Swell
04 – Bumps and Sags	09 – Lane/Shoulder Drop	14 – Railroad Crossing	19 – Raveling
05 - Corrugation	10 – L&T Cracking	15 – Rutting	20 – Weathering

Figure 1. Asphalt Distresses

## CITY OF ZANESVILLE – 2015 PAVEMENT MANAGEMENT FINAL REPORT

21 – Blow Up	26 – Joint Seal Damage	31 – Polished Aggregate	36 – Scaling
22 – Corner Break	27 – Lane/Shoulder Drop	32 – Popouts	37 – Shrink Cracking
23 – Divided Slab	28 – Linear Cracking	33 – Pumping	38 – Corner Spall
24 – Durability Crack	29 – Large Patch	34 – Punchout	39 – Joint Spall
25 – Faulting	30 – Small Patch	35 – Railroad Crossing	

Figure 2. Concrete Distresses

### PCI AND CONDITION CATEGORY DEFINITION

The PCI is on a scale of 0 – 100 with 0 being the worst and 100 being the best. It is calculated by PAVER™ through the input of distress type, severity and quantity information. Figure 3 illustrates the factors that go into the PCI as well as the seven (7) condition categories of the PCI.

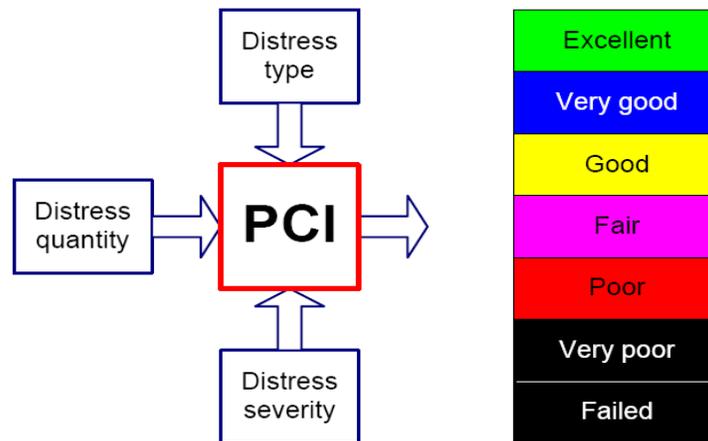


Figure. 3 Factors Determining PCI Value

To further simplify the condition assessment of each pavement section, seven (7) condition categories were developed criteria is listed in table 1.

CONDITION CATEGORY	LOW PCI VALUE	HIGH PCI VALUE
Excellent	92	100
Very Good	82	91
Good	68	81
Fair	50	67
Poor	35	49
Very Poor	20	34
Failed	0	19

Table 1. Condition Category Values

## NETWORK CONDITION RESULTS

After completion of the 2015 pavement management project, JG3 has determined that the average PCI for the City of Zanesville’s 133 centerline mile (306 lane mile) Roadway Network was a **58** and considered to be in **Fair** condition. Figures 4, 5, 6 and 7 further illustrate the condition breakdown.

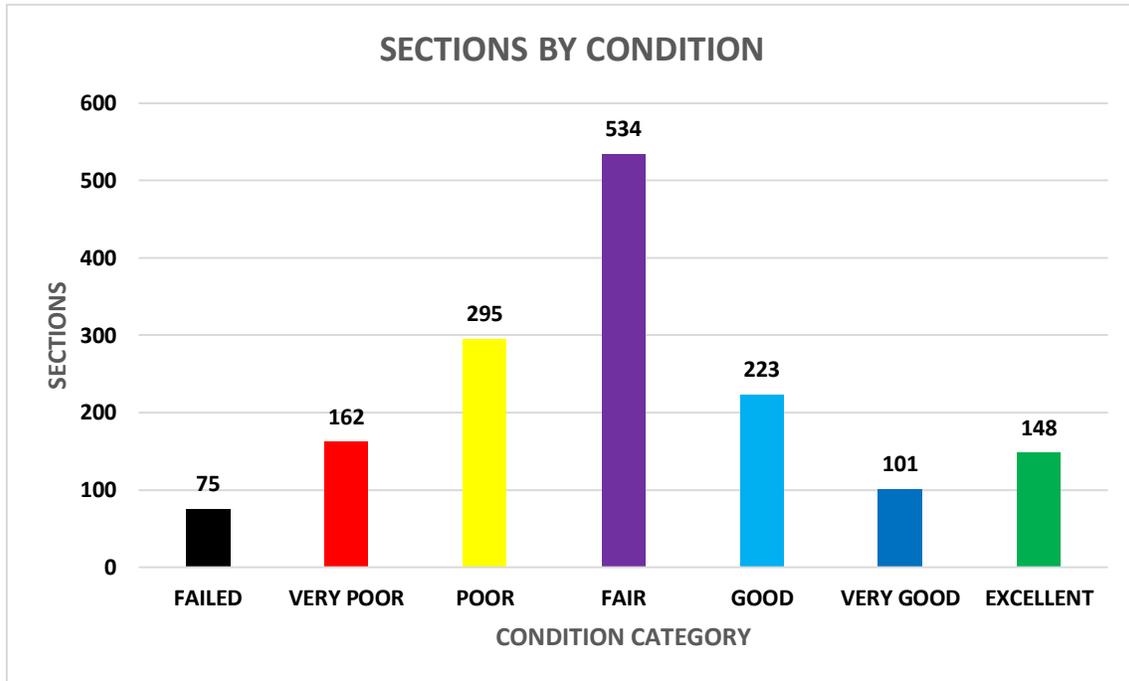


Figure 4. Number of Sections by Condition

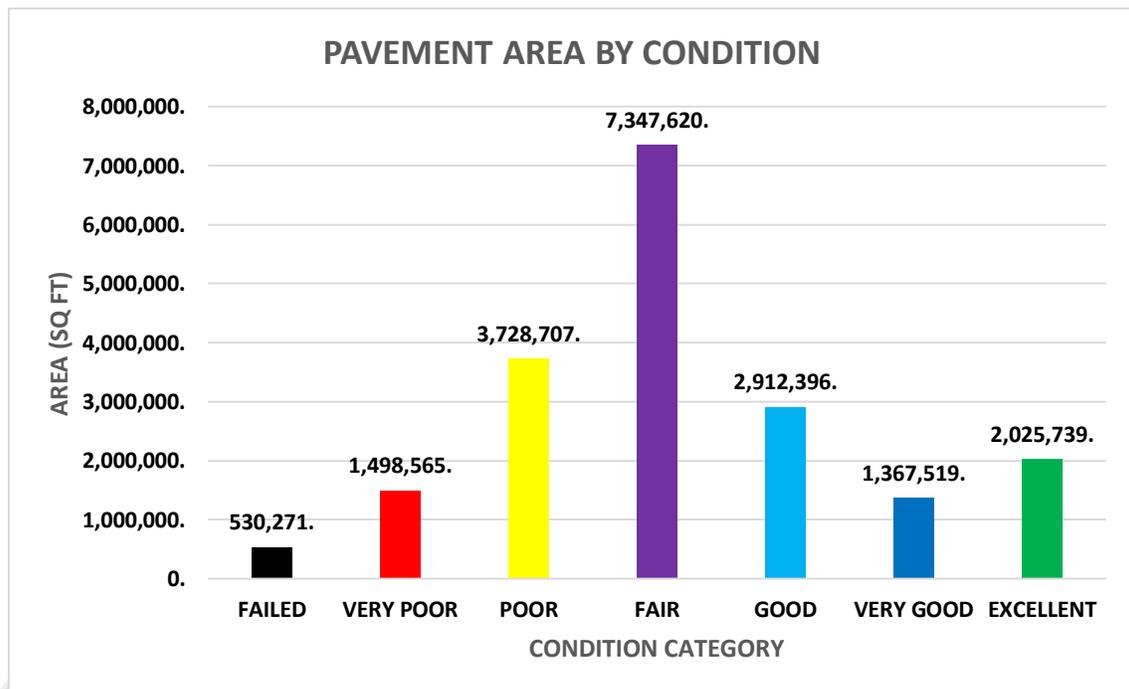


Figure 5. Pavement Area by Condition

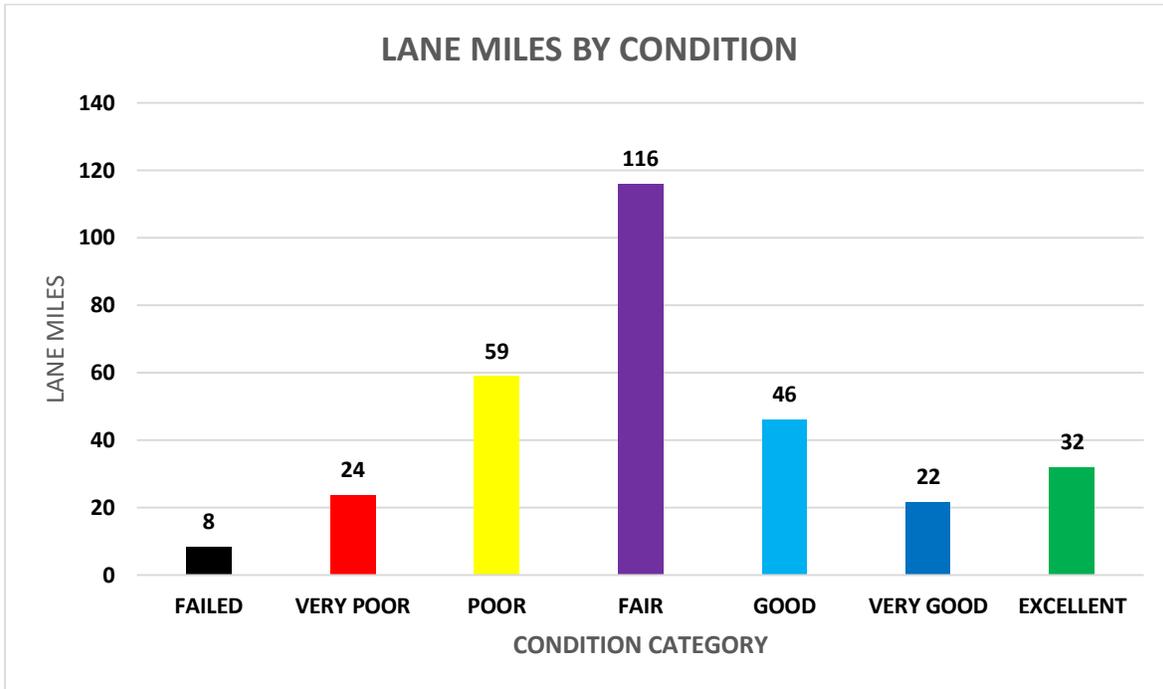


Figure 6. Lane Miles by Condition

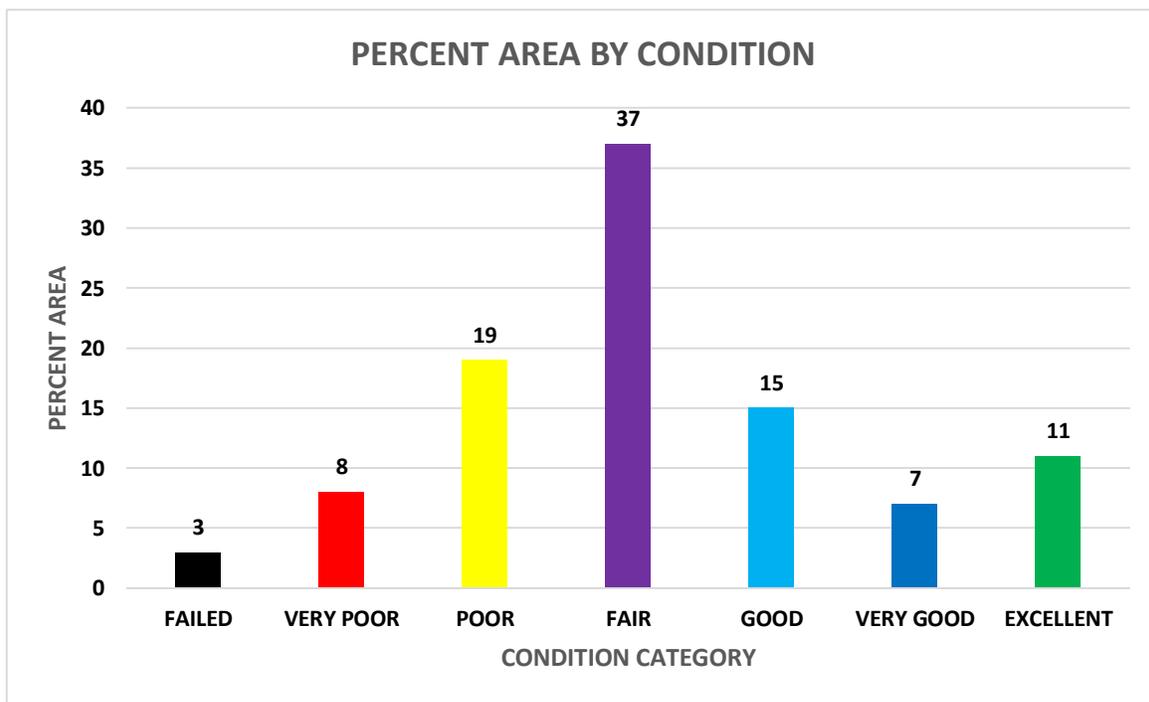


Figure 7. Percent Area by Condition

NETWORK CONDITION MAP

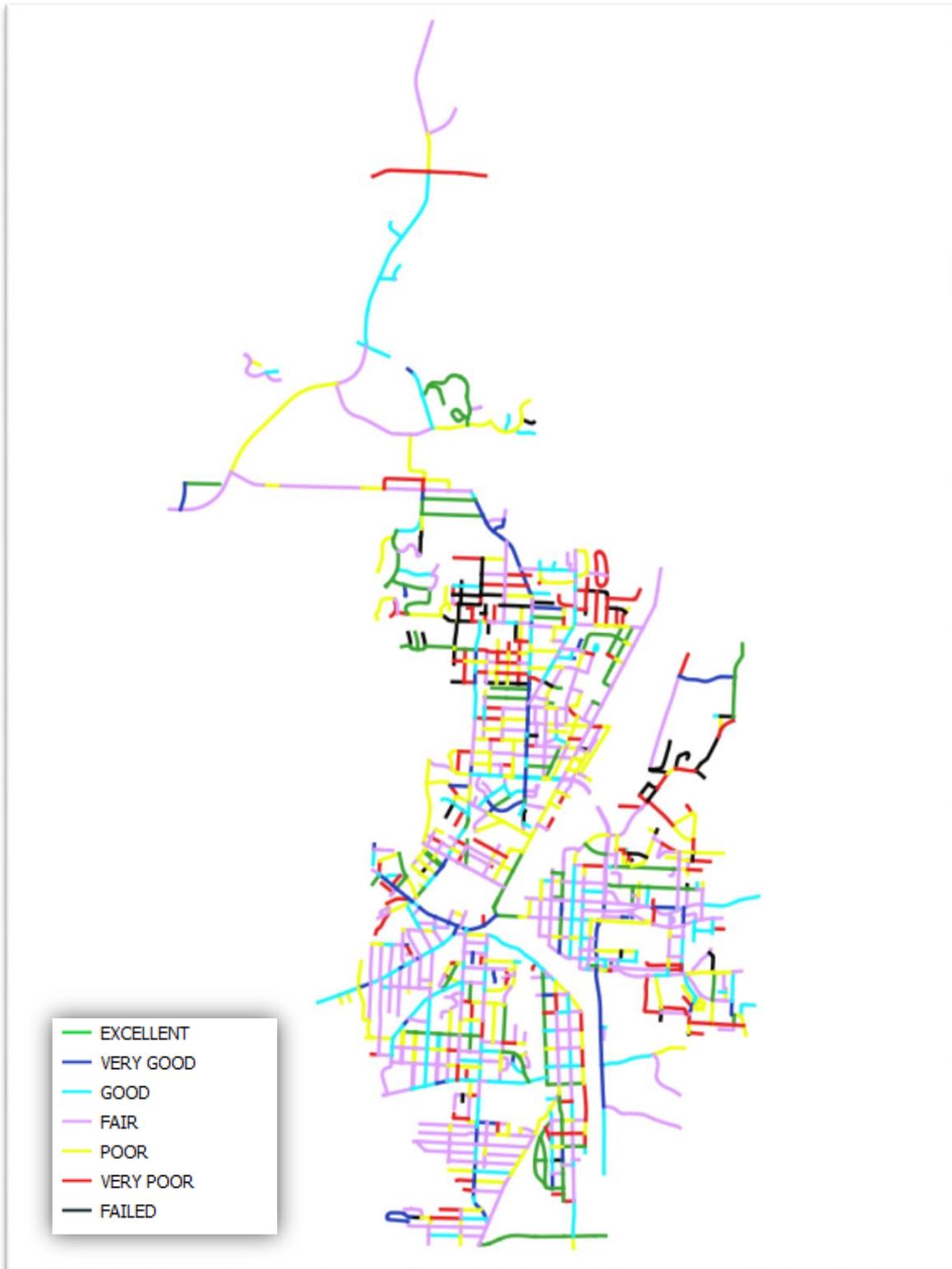


Figure 8. Network Condition Map

## AREA CONDITION COMPARISON

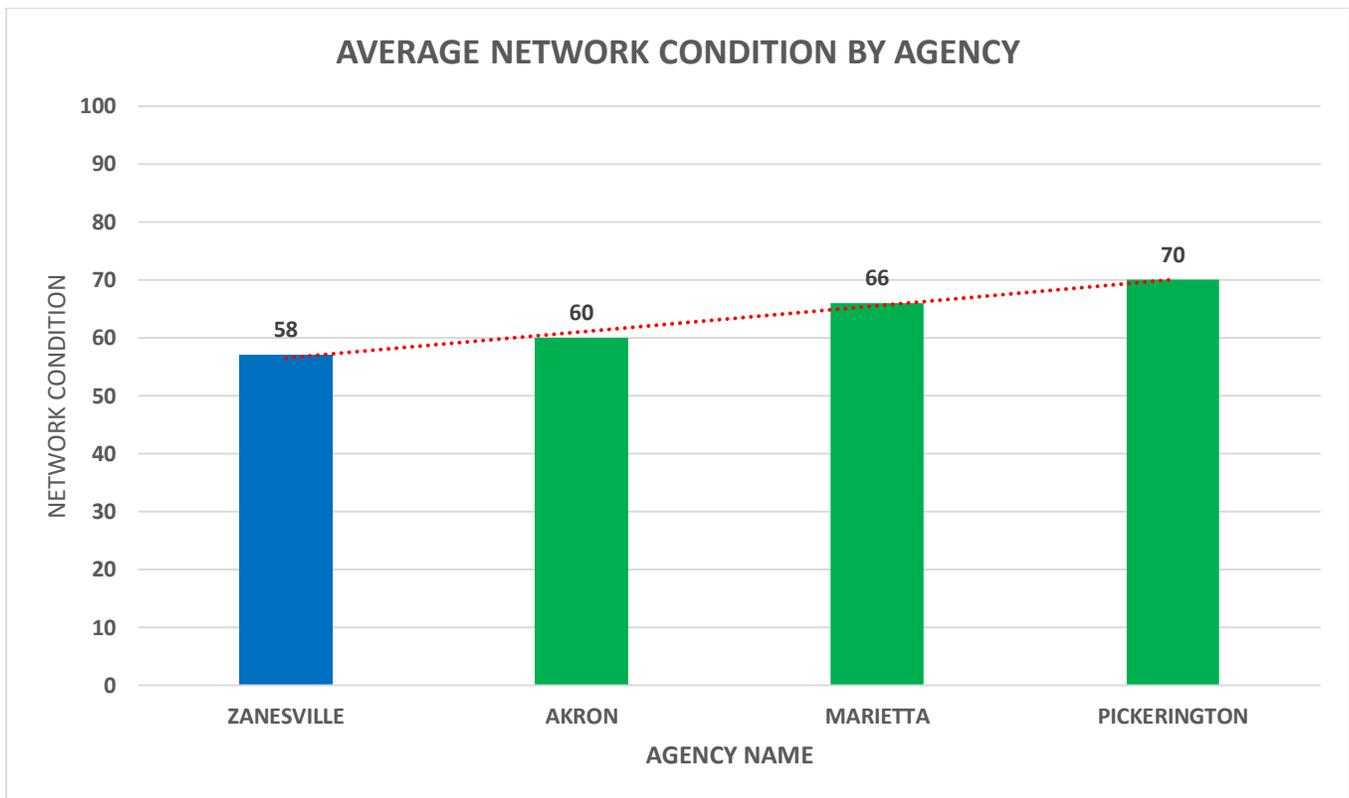


Figure 9. Agency Condition Comparison

## DIGITAL IMAGES

During the inspection process, a digital image was taken at each sample location. This allows for a visual identification as to what types of distresses are occurring within the pavement section. These digital images were then linked within the PAVER database to allow for fast image retrieval. In addition to linking the images within PAVER, JG3 also provided a fully indexed DVD containing these digital images. The following 2015 images of pavements from within the roadway network provide a sense of what various PCI levels actually look like:

**CITY OF ZANESVILLE – 2015 PAVEMENT MANAGEMENT FINAL REPORT**

DIGITAL IMAGES – EXCELLENT CONDITION CATEGORY



LICKING RD | SECTION 03 | SAMPLE .1MI | PCI 100

DIGITAL IMAGES – VERY GOOD CONDITION CATEGORY



W MAIN ST | SECTION 03 | SAMPLE 1614 | PCI 86

DIGITAL IMAGES – GOOD CONDITION CATEGORY



DRYDEN RD | SECTION 10 | SAMPLE AYERS | PCI 76

DIGITAL IMAGES – FAIR CONDITION CATEGORY



HAMLIN AVE | SECTION 02 | SAMPLE 302 | PCI 63

DIGITAL IMAGES – POOR CONDITION CATEGORY



VIRGINIA ST | SECTION 02 | SAMPLE ALLEY | PCI 50

DIGITAL IMAGES – VERY POOR CONDITION CATEGORY



CHESTER ST | SECTION 01 | SAMPLE 923 | PCI 28

DIGITAL IMAGES – FAILED CONDITION CATEGORY



FRANCIS ST | SECTION 06 | PARK | PCI 4

## CONCLUSION

The PCI study provides for a PCI rating on each pavement section within the maintained roadway network. Based upon the distresses identified within each representative sample location inspected, a PCI number is assigned to each pavement section. This number is on a scale of 0 – 100 with 0 being the worst and 100 being the best.

The City of Zanesville’s Roadway Network is approximately 133 centerline miles (306 lane miles) in size. Through the ASTM D6433-11 PCI study, JG3 has determined the Roadway Network to have an average PCI of **58** and is considered to be in “**Fair**” condition. In comparison to other PAVERTM users and JG3 clients within the region, the City of Zanesville’s Roadway Network is considered to be below average.

JG3 would again like to thank you for the opportunity to provide the City of Zanesville with this PCI study and our pavement management services. Our goal is to provide the highest level of services and support, providing our clients with the data, tools and expertise necessary to be successful in their goals of pavement management. Should you require any additional information or support regarding this PCI study or the PAVERTM PMS, please do not hesitate to ask.

JAMES GOLDEN III  
President/CEO



P: (740) 507-3842

E: [jgolden@jg3consulting.com](mailto:jgolden@jg3consulting.com)