RESOLUTION NO. 2014-3156

A RESOLUTION APPROVING THE CITY'S 2014 CITYWIDE PAVEMENT CONDITION EVALUATION AND STREET MAINTENANCE PRIORITIZATION PLAN

RECITALS:

1. The City of Newberg needs a comprehensive roadway asset management program to keep track of and prioritize the maintenance, and replacement of the city's right of way infrastructure that includes, but not limited to, the city's pavement, street trees and sidewalk facilities. City Council is supportive of this right of way infrastructure preservation effort after the needs were first presented to the council at the meeting on May 6, 2013.

2. On November 4, 2013, the city executed a professional services agreement with Pavement Services, Inc. (PSI) in the amount of $92,726.00, as authorized by Resolution No. 2013-3090 on October 21, 2013, to perform the citywide pavement condition evaluation and street maintenance prioritization project. The consultant work included pavement coring for structural analysis, traffic analysis, a field survey of existing conditions, and a maintenance priority analysis.

3. On February 18, 2014, the consultant gave a work progress report of the citywide pavement conditions and street maintenance prioritization projects to the City Council. The work to evaluate the pavement condition and to prioritize street maintenance has now been completed, and the project meets its objectives as noted below:

   (a) To implement a pavement management system that utilizes the city's geographic information system (GIS);
   (b) To establish the current conditions of the existing street system;
   (c) To determine the immediate and future maintenance and rehabilitation needs; and
   (d) To supplement the inventory of street information on the existing pavement structure within the city limits.

4. The pavement condition evaluation and street maintenance prioritization plan provides a detailed budget analysis of several funding scenarios, and includes a street utility fee survey compiled from 23 Oregon cities. The analysis indicates that an annual budget of $1.89M will be required to maintain the city's current pavement condition index at 73.

5. The executive summary and pertinent information for the pavement condition evaluation and prioritization plan is attached as Exhibit A.

THE CITY OF NEWBERG RESOLVES AS FOLLOWS:

The Newberg City Council does hereby approve the citywide pavement condition evaluation and street maintenance prioritization plan, which is hereby attached as Exhibit A and by this reference adopted.

- **EFFECTIVE DATE** of this resolution is the day after the adoption date, which is: July 8, 2014.

ADOPTED by the City Council of the City of Newberg, Oregon, this 7th day of July, 2014.

Norma I. Alley

Norma I. Alley, MMC, City Recorder

ATTEST by the Mayor this 10th day of July, 2014.

Bob Andrews

Bob Andrews, Mayor

DRAFT

Exhibit A to
Resolution No. 2014-3156

PROJECT REPORT

Pavement Management System Implementation

Prepared For:
City of Newberg
414 E. First Street
Newberg, OR 97132

May 16, 2014

Prepared By:

PAVEMENT SERVICES, INC.
3835 NE Tillamook Street
Portland, Oregon 97212
(503) 235-0377

Project No. *13075*

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Exhibit A to
Resolution No. 2014-3156

EXECUTIVE SUMMARY

Pavement Services, Inc. (PSI) produced this Pavement Management Report to establish a pavement management system and a baseline condition of the City of Newberg, 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 formulated multiyear maintenance and repair (M&R) project list. In addition to the listed pavement management activities, pavement coring was conducted to determine the in situ pavement structure layers, and traffic counts were performed to update Federal Functional Classification (FFC).

The street network is conservatively valued at $500 million (April 2013 Newberg Council Meeting). This asset is typically described in lane miles and/or centerline miles. Currently, Public Works manages 69.4 centerline miles 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 is 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 MicroPAVER 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 MicroPAVER 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 Newberg street system is rated as 73 or "Good". The PCI scale used was Good, Fair, and Poor; where Good is from 100 to 71, Fair is from 70 to 56, and Poor is 55 to 0. The pavement condition distribution in Newberg is 66% Good, 12% Fair, and 22% 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 to deteriorate slightly right after construction and then the deterioration levels off. The leveling off period is where the deterioration condition slows relative to time. The location of slower deterioration is the time where 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 deteriorates more quickly into a poor condition state. An example of typical pavement deterioration is presented in Figure 2.

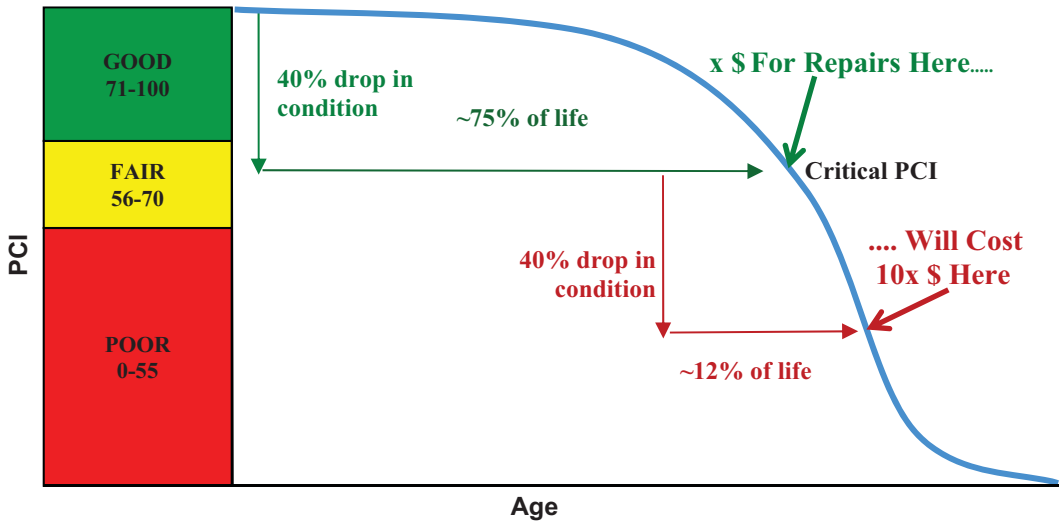

Figure 2 – Typical Pavement Deterioration Curve

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 an overlay, that is done before a pavement deteriorates below the critical PCI usually costs substantially lower due to the better condition of the pavement.

For some time, street repair funding levels for the City have not kept pace with rehabilitation needs. To help address this need, the City is interested in establishing supplementary funding. Supplementary funding could be generated from the implementation of a gas tax, street utility fee, user mileage fee, a bond, or other means. The revenue from supplementary funding will assist in reducing the backlog of street repair projects. Specifically, based on the 2014 pavement condition ratings, the City has a backlog of $14.3 million. By maintaining the current M&R budget of $150,000, the backlog is projected to continue to grow unless funding levels are increased.

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 $2.8M over the next seven years would eliminate the M&R backlog for the entire street system.

Scenario 2. At the current funding level of $150,000 annually, the M&R backlog will grow to $21.0M by the year 2022.

Scenario 3. Supplementary funding of $336,000 per year increases the annual budget to $486,000. At an annual investment level of $486,000, the M&R backlog will grow to $17.9M by 2022.

Scenario 4. In order to stabilize the condition of the street system at the current PCI of 73, an annual budget of $1.87M is required during the period of 2014-2022. At this level of investment, the M&R backlog shrinks to $9.8 million by 2022.

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

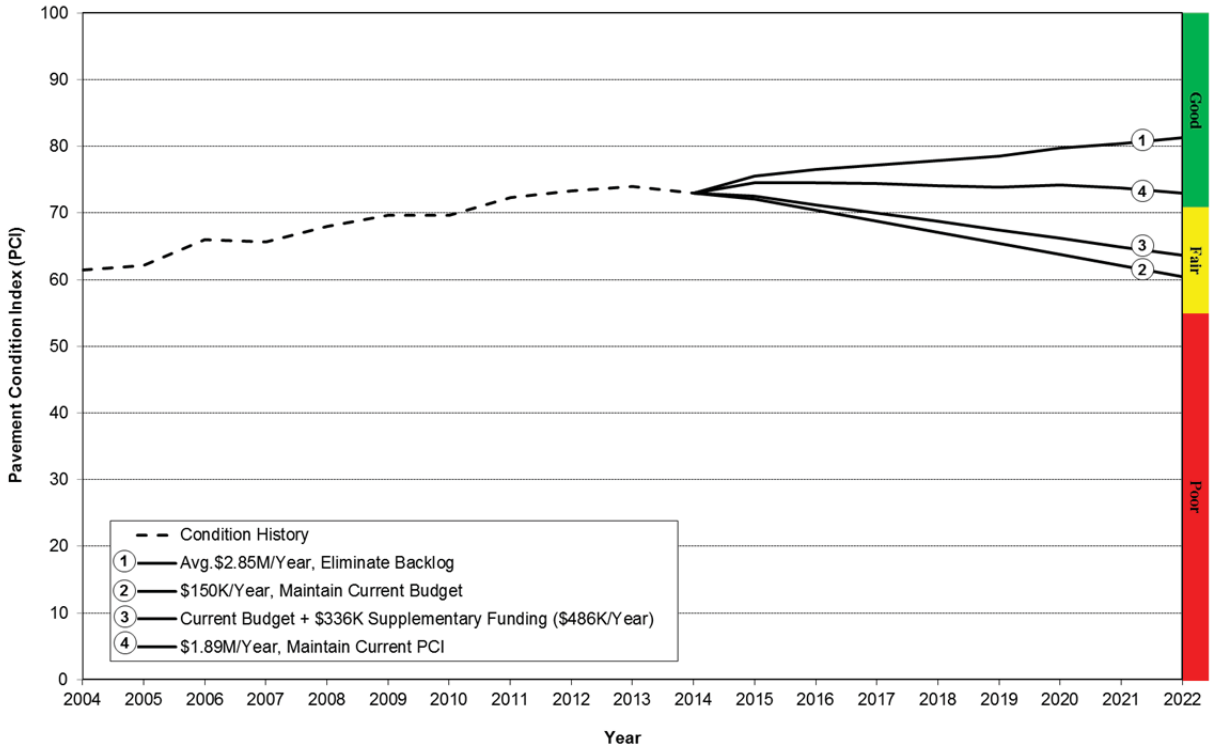

Figure 3 – Various Budget Effects on PCI

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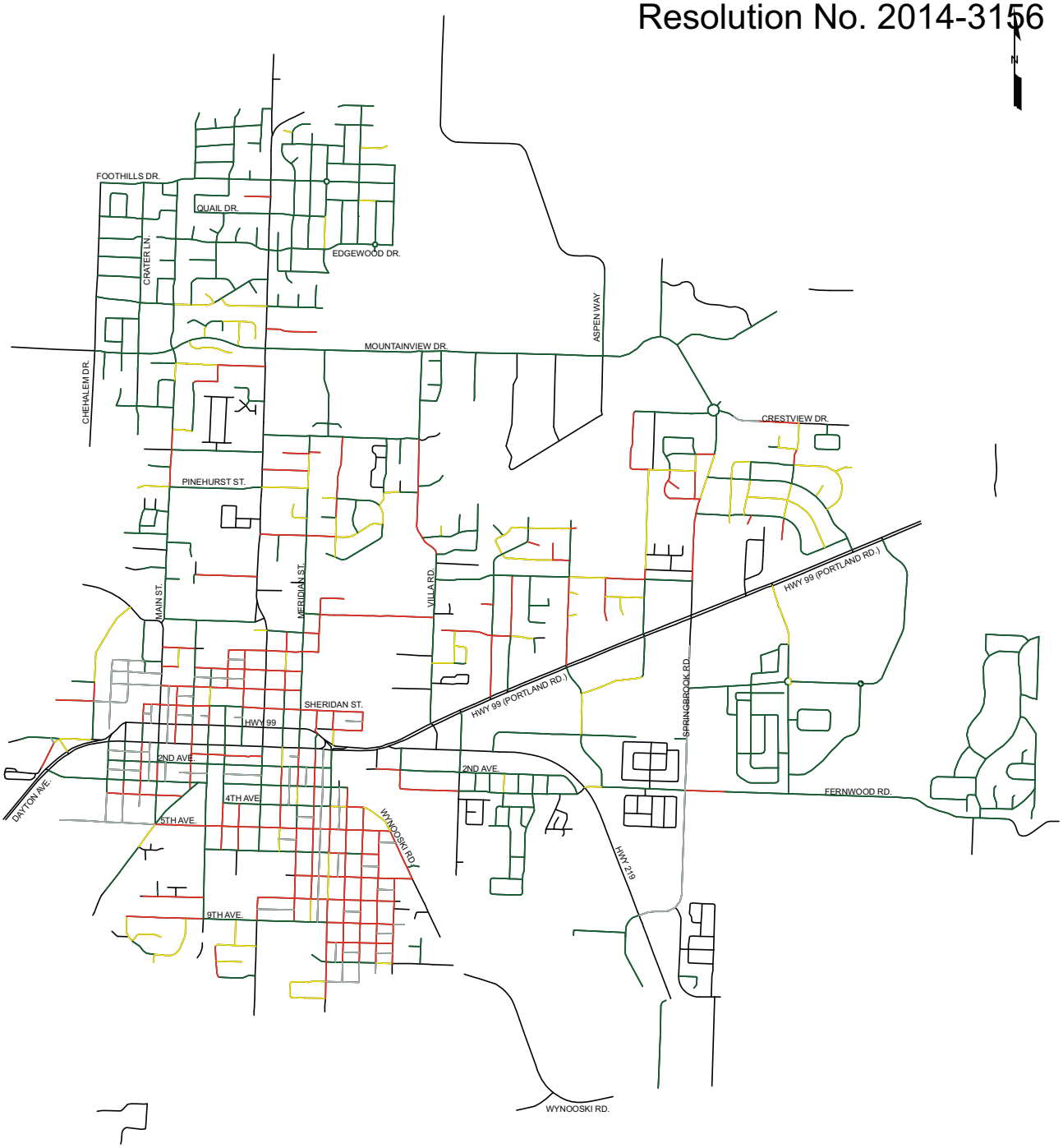
Resolution No. 2014-3156



Legend

2014 Survey PCI Results

- Good (71 - 100)
- Fair (56 - 70)
- Poor (0 - 55)
- Inventoried/ Not Surveyed
- Not Managed by Newberg

1 inch = 1,600 feet

PAVEMENT SERVICES, INC.
INNOVATIVE PAVEMENT SOLUTIONS

Date: 4/12/2014 Job No: 13075

2014 PAVEMENT CONDITION INDEX SURVEY RESULTS
Newberg, Oregon

FIGURE
1

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INTRODUCTION

City of Newberg Public Works Department maintains and operates approximately 70 centerline miles of local, collector, and arterial streets. Approximately 65 centerline miles of the existing street system is constructed of asphalt concrete (AC), with the remainder being gravel roads and portland cement concrete (PCC). The City has a desire to establish the current condition of the pavement surface and establish a maintenance and rehabilitation (M&R) plan for the next seven years.

In the past, the City has conducted pavement condition surveys using the Oregon Department of Transportation (ODOT) Good-Fair-Poor (GFP) pavement rating system. The ODOT GFP system was previously a system that used a 1-5 scale, with 5 being very good and 1 being very poor. The ODOT system was modified in 2010 to include an updated 0-100 rating scale and new descriptions of pavement distresses. The system is essentially subjective in that it allows the rater to apply considerable judgment in rating the pavement surface condition as he or she drives the pavement at speeds up to the posted speed limit. We are not aware of a pavement management system (PMS) that uses the ODOT distress survey method. This means that in order to use the GFP method, Newberg would likely have to develop an ad-hoc system for analysis and evaluation of the distress data for M&R prioritization.

In 2013, the City adopted the ASTM International Test Method D-6433 as the standard method for conducting pavement surveys. ASTM D 6433 is the Pavement Condition Index (PCI) system for local roads and streets which uses a zero to 100 rating scale. Surveys are conducted visually by foot, which provides the best vantage point for observing the actual condition of the pavement surface. By standing or walking the pavement surface, the pavement rater has the opportunity to closely observe pavement distresses such as cracks, weathering, raveling, and rutting, allowing for a better assessment of the amount of distress in a specific survey location.

In 2013, the City also adopted the MicroPAVER software as its pavement management system (PMS). MicroPAVER was selected as the pavement management system because it is based upon the ASTM D-6433 methodology and it uses a proactive management approach as opposed to a reactive management approach. A proactive approach uses a long-term, life-cycle perspective and takes advantage of sound, engineering-based procedures.

MicroPAVER is the pavement management system developed by the US Army Corps of Engineers. MicroPAVER aids pavement managers in deciding when and where to appropriate funds for pavement M&R.

The City of Newberg is considering various resources for supplementary funding in order to increase the current level of funding for street pavement M&R. The City is interested in using the PMS to understand the impact on the condition of the street system based on different funding levels, and to prioritize street M&R projects during the period of 2014-2022.

OBJECTIVES

This project for the City involves several objectives. The first was to implement a pavement management system. Second, we established the current condition of the street system. Third was to determine the immediate and future M&R needs. Additionally, the City wanted the Federal Functional Classification (FFC) of the streets to be reviewed and updated. The last objective was to supplement the inventory of information the City has on the in place pavement structure of the streets. In order to achieve these objectives, Pavement Services, Inc. performed the following tasks:

1. Conducted a visual condition survey of the street network using the ASTM D6433-11: *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys* method.
2. Determined the consequences of the current budget and the impacts of supplementary funding on the pavement condition.
3. Prioritized M&R projects for the 2014-2022 timeframe so the City can manage expenditures and begin to implement a preservation management style.
4. Advanced pavement cores on City streets to determine the pavement layer thicknesses of the in situ structure.
5. Updated the current FFC of minor arterials, major collectors, and minor collectors by using a traffic count study.

In addition to the objective desired by the City, we developed a brief structural condition report for locations where coring activities took place.

PAVEMENT MANAGEMENT METHODOLOGY

MicroPAVER Database

PSI developed a MicroPAVER database by populating an inventory with accurate information regarding the street network such as the street geometry, surface type, location, and the historical construction and maintenance data.

Currently, the Newberg street network is defined and managed in a Geographical Information System (GIS). The City provided PSI with their GIS data and maintenance records from Cartegraph. Utilizing this data, we were able directly imported the City's pavement inventory into MicroPAVER using the "Create PAVER Inventory from Shape Data" tool.

Pavement Condition Index (PCI)

PSI conducted a PCI survey from December 16, 2013 through February 2, 2014. Due to the typically wet climate in Newberg during the winter months, we performed the survey only on days when the pavements were free of standing water.

Our survey crews used the MicroPAVER FieldInspector handheld tablet devices for data collection in the field. The FieldInspector allowed us to improve the accuracy of the data by

eliminating redundant data entry. It also streamlined the data handling process by allowing us to compute the pavement condition index as soon as the day following the inspection.

Pavement Condition Prediction Models

Prediction models are used to predict future pavement condition, which is an essential component of M&R planning. The models are developed using historical PCI inspection data from a specific location (e.g., airport, city, town, etc.). A model is developed for each group of pavement sections that share similar characteristics (e.g., surface type, functional use, rank, etc.). For example, a model may be developed for asphalt surfaced minor arterial street.

In order to develop an effective prediction model, we must establish the age of each pavement section with unknown last major construction dates. Having both the last major construction date (age) and the PCI from one or multiple inspections allows us to accurately model the condition deterioration of a pavement.

The age of a pavement section is based on the last major M&R activity (e.g., structural overlay, reconstruction, etc.). The date of the last major M&R activity is referred to as the last construction date (LCD).

Newberg had a large number of sections unknown LCD due to incomplete historical work records. For pavement sections where we didn't have LCD information we were able to use the LCD. For the LCD backcalculation we assumed a deterioration rate of 2.5 PCI points per year for the minor arterials, major collectors, and minor collectors roadway pavements and 1.5 points per year for the residential pavements.

The backcalculation starts from the first inspection following the uncertain LCD, as shown in Figure 4. In this example, a pavement with a PCI of 90 in 2012 would have a backcalculated LCD of 2007, assuming a condition deterioration rate of 2.0 PCI points/year.

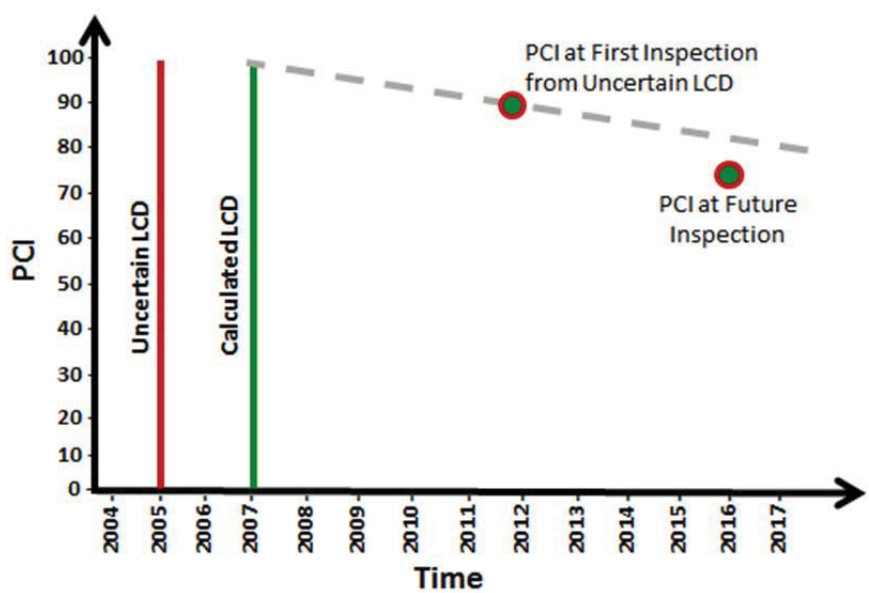

Figure 4. LCD Backcalculation Process.

To predict future condition, we used the same assumed deterioration rates of 2.5 points per year for arterials and collectors, and 1.5 points per year for residential streets. We used a straight line deterioration model because the 2013 condition rating was the first PCI inspection for the Newberg street system. Once a few PCI inspections have been conducted, the MicroPAVER prediction modeling can use the actual deterioration patterns of pavements to determine the future condition. Models using the actual deterioration patterns of the pavements are developed when each pavement sections has multiple PCI and work history data points.

For Newberg, the pavements with known LCD were used to develop deterioration rates. Deterioration rates can change over time due to changes in traffic or infrastructure development and therefore, deterioration rates and prediction models should be updated on a regular basis.

Development of M&R Plans

The MicroPAVER M&R work planning module identifies when and where M&R is required and how much it will cost. M&R plans can be developed either by assuming an annual budget or by identifying the desired pavement condition. Based on either a known annual budget or a desired overall condition level, MicroPAVER will produce a prioritized M&R plan.

PSI developed M&R plans are determined for nine budget years, where the first plan year begins in April 2014 and the last plan year begins in April 2022. The following four budget scenarios were considered:

Scenario 1. Eliminate Backlog: This scenario eliminates all unfunded major M&R requirements by the year 2022. More specifically, it eliminates the M&R backlog and ensures that all pavement sections have PCI values greater than the critical PCI. The critical PCI is described in Appendix I.

Scenario 2. Maintain Current Budget: This scenario assumes that the current annual budget of $150,000 is maintained annually.

Scenario 3. Current annual budget ($150,000) + $336,000 annually: This scenario represents the addition of supplementary funding from sources such as a gas tax, street utility fee, or a user mileage fee. We ran the analysis with a total annual budget of $486,000.

Scenario 4. Funding to Stabilize Street System at the Current PCI: This scenario maintains the average PCI of the street system at 73 through the year 2022.

MicroPAVER determines the timing to perform M&R based on predicted future pavement conditions. The anticipated cost of performing M&R is based on cost tables that relate M&R cost to PCI. The cost tables used in this analysis can be seen in Appendix E. The budget scenarios include only pavements inspection data collected during the 2014 survey. We set the critical PCI to 60 for all M&R plans. Appendix C includes detailed results for the M&R planning analysis.

M&R Recommended Projects

Project development and prioritization was based upon the current and future predicted pavement condition. The pavement sections selected for projects were first generated by optimizing the budget and performing preservation based analysis within the MicroPAVER software. We then grouped the sections into projects based upon the year the work is to be performed. Each pavement section was assigned M&R activities based upon the PCI and the distresses observed during the 2014 survey. For example, a pavement with any severity level of alligator cracking or rutting triggers a requirement for full depth patching. For pavement with only low or medium weathering, low severity patching, or low severity longitudinal/transverse cracking a surface treatment is assigned. Mill and overlay is triggered for pavements with medium and high severity cracking, patching, block cracking, weathering, or raveling. Note that these recommendations are developed at the network level. Network level work looks at the entire system as a whole in order to evaluate the large scale need such as funding or backlog. Project level work includes performing in-depth evaluation. Project level work typically occurs before preparing plans and specifications for a specific M&R project. Additional structural and project level analysis is required to implement these project recommendations.

PCI SURVEY RESULTS

A total of 69.4 centerline miles of pavements were surveyed as part of this project. This accounts for approximately 93.5% of the total centerline miles of streets in Newberg. The remaining 6.5% of street that were not surveyed was due to construction and unsurfaced streets.

The average PCI of the Newberg street system was 73 on a scale of 0 to 100. Herein, the term average indicates area-weighted average unless otherwise specified. The standard rating scale defines seven PCI categories. This scale can be customized to have as many categories as desired in order to more easily view the distribution of PCI. For Newberg, we used a three-category scale as shown in Figure 5. Having three condition categories allows for quick observation of pavements that are in need of immediate repair (56 to 70), or which pavements have fallen into the poor category (0 to 55) and may require more costly repairs.

Figure 5. PCI Rating Scales

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Table 1 presents the overall PCI for the sections that were classified as minor arterial, major collector, minor collector, and residential streets.

Table 1. Newberg Pavement Network Pavement Condition Index Results

Pavement Classification	Pavement Sections	Section Area (SqFt)	Section Area (%)	Weighted Average PCI	PCI Rating
Minor Arterial	22	394,522	4%	81	Good
Major Collector	156	2,427,297	22%	79	Good
Minor Collector	57	732,393	7%	88	Good
Residential	715	7,578,696	68%	71	Good
All Inspected	950	11,132,908	100%	73	Good

Figure 6 through Figure 9 provide a graphical representation of the PCI distribution for each of the pavement classifications listed in Table 1.

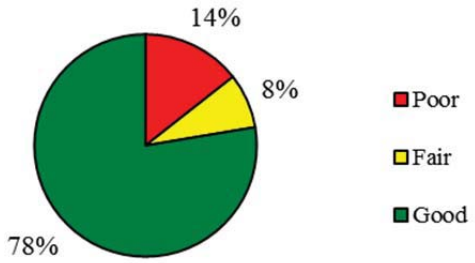

Figure 6. PCI Distribution for Minor Arterial Streets

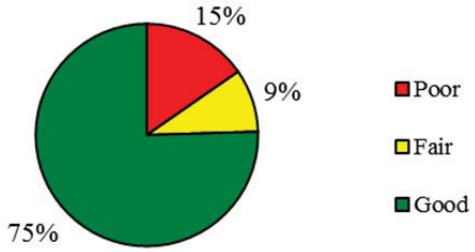

Figure 7. PCI Distribution for Major Collector Streets

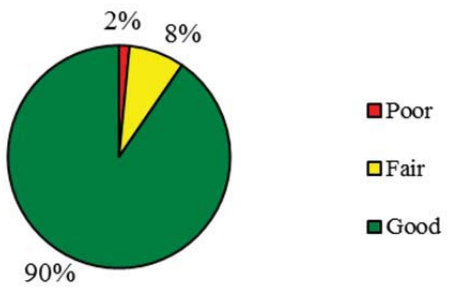

Figure 8. PCI Distribution for Minor Collector Streets

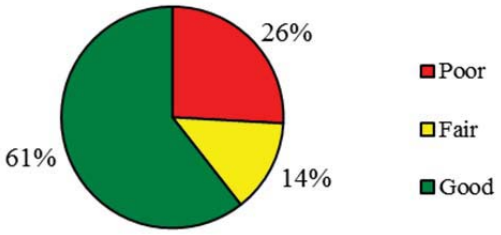

Figure 9. PCI Distribution for Residential Streets

Shown another way, Figure 10 presents the overall PCI distribution of the Newberg pavement network.

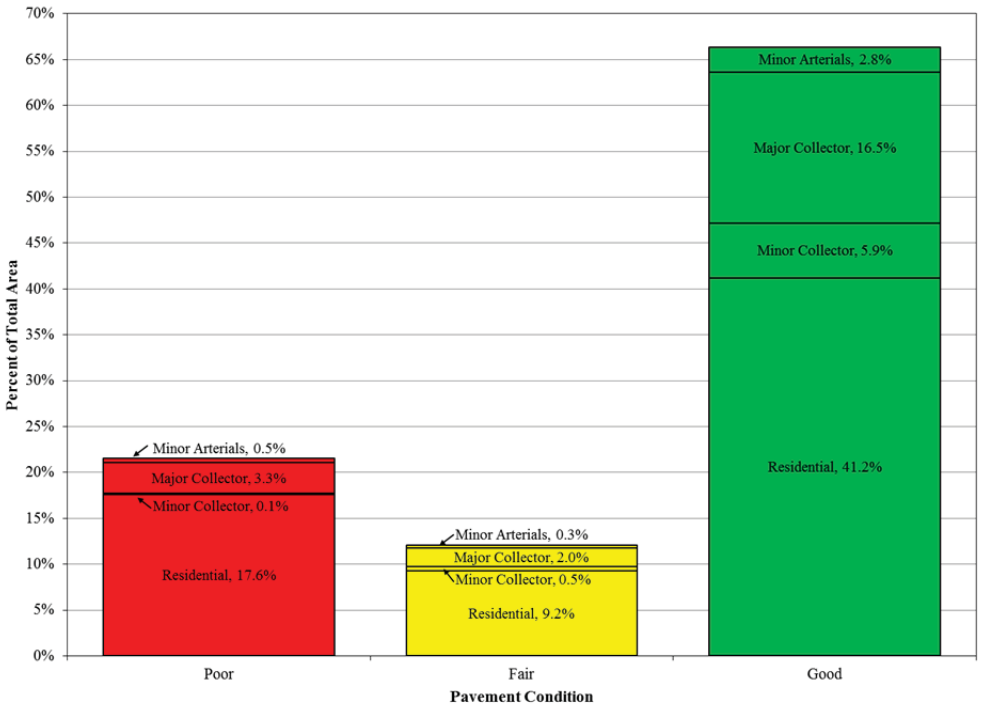

Figure 10. Overview of the Newberg Pavement Condition in 2014

For further detail, consult the following Appendices, which contain information on the condition of the Newberg street network:

- Appendix A contains tables showing summary inventory and condition data by section.
- Appendix B contains maps that show section identification and PCI ratings.

BUDGET SCENARIO ANALYSIS

PSI analyzed four budget scenarios for the period of 2014-2022 and the results are summarized below. Additional graphical information regarding the comparison of the budgets and the effects on the PCI are in Appendix C.

The M&R costs in the analysis are based on estimated unit prices from bid tabs that were provided by the City of Newberg. These costs are presented in constant 2014 dollars, i.e., they assume no inflation over the long term.

Scenario 1 – Eliminate M&R Backlog

M&R backlog is any major work type that is required for a pavement with a PCI below critical value. The backlog for Newberg as of 2014 is approximately $14.3M. The results of the analysis found that an annual budget of $2.85M dollars is needed to eliminate the backlog by the year 2022. Table 2 shows on an annual basis the resulting PCI values before and after the application of the funding, the total backlog, and the unfunded sustainment costs, which includes all stopgap, preventive, global, and major work above critical PCI.

Table 2–Scenario 1 Analysis Results

			Unfunded M&R Cost			
Year	PCI Before Repair	Funded M&R Cost[1]	Major Below Critical[2]	Sustainment[3]	Total[4]	PCI After Repair
2014	73	$2,852,572	$14,281,552	$1,071,631	$15,353,183	77
2015	76	$2,854,394	$13,432,635	$0	$13,432,635	78
2016	77	$2,853,496	$11,354,653	$0	$11,354,653	79
2017	77	$2,845,919	$9,279,007	$0	$9,279,007	80
2018	78	$2,852,116	$7,409,031	$0	$7,409,031	80
2019	79	$2,844,274	$6,611,394	$0	$6,611,394	82
2020	80	$2,852,898	$4,640,707	$0	$4,640,707	82
2021	80	$2,852,747	$2,535,105	$0	$2,535,105	83
2022	81	$2,660,486	$0	$0	$0	85
	Total Funded:	$25,468,902		Total Unfunded:	$0	

Notes: [1]Total Funding for the M&R budget scenarios. [2]Any major M&R under critical PCI (60). [3]Sustainment includes stopgap, preventive, global, and major above critical M&R unfunded values. [4]The sum of the major below critical and sustainment unfunded values.

The total cost over the next nine years, including the funded and unfunded M&R cost is $25.5M.

The resulting annual M&R cost after eliminating backlog in 2022 would be approximately $533,000 annually for the five years following and would result in a network PCI of 79 in year 2027.

Scenario 2 – Maintain Current Budget of $150,000 Annually

With continued funding at the current level, the average PCI is estimated to decline to 60 by 2022. It is projected that the cost of the M&R work backlog will increase to about $21.0M in 2022. By maintaining this low annual budget, it is estimated that by 2022 the total unfunded M&R costs will exceed $24M, which is amounts to the addition of $0.5M annually in backlog.

A summary of this budget is shown in Table 3. The total cost over the next nine years, including the funded and unfunded M&R cost is $25.8M if the current budget is maintained.

Table 3–Scenario 2 Analysis Results

			Unfunded M&R Cost			
Year	PCI Before Repair	Funded M&R Cost[1]	Major Below Critical[2]	Sustainment[3]	Total[4]	PCI After Repair
2014	73	$147,070	$14,281,552	$3,805,217	$18,086,769	74
2015	72	$146,569	$14,703,500	$3,937,831	$18,641,331	72
2016	70	$148,001	$15,335,214	$3,901,595	$19,236,809	71
2017	69	$146,763	$15,832,083	$3,956,873	$19,788,956	69
2018	67	$147,733	$16,501,258	$4,038,614	$20,539,873	67
2019	65	$149,628	$17,260,011	$3,993,041	$21,253,052	66
2020	64	$143,658	$18,486,971	$3,839,062	$22,326,033	64
2021	62	$144,994	$19,418,736	$3,716,061	$23,134,798	62
2022	60	$149,169	$20,954,237	$3,521,434	$24,475,671	61
	Total Funded:	$1,323,585		Total Unfunded:	$24,475,671	

Notes: [1]Total Funding for the M&R budget scenarios. [2]Any major M&R under critical PCI (60). [3]Sustainment includes stopgap, preventive, global, and major above critical M&R unfunded values. [4]The sum of the major below critical and sustainment unfunded values.

Scenario 3 – Current Budget of $150,000 + $336,000 in Supplementary Funding, Totaling $486,000 Annually

The City is exploring ways to obtain supplementary funding through several mechanisims, including a gas tax, street utility fee, or a bond. The additional funding would help the City address looming M&R requirements.

We surveyed cities in Oregon and found that many currently have a street utility fee in place. Table 4 summarizes the list of cities surveyed and their respective street utility fee.

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Table 4 – Oregon City's Street Utility Fees

Oregon City	Street Maintenance Utility Fee
Albany	No
Ashland	$7.94
Bay City	$5.00
Canby	$5.00
Eagle Point	$5.00
Grants Pass	$3.00
Happy Valley	No
Hillsboro	$3.10
Lake Oswego	$4.00
McMinnville	No. TSDC (one-time fee)
Medford	$6.55
Milwaukie	$3.35
North Plains	$0.90
Oregon City	$11.56
Salem	No
Sherwood	$2.00
Silverton	$5.00
Springfield	No
Talent	$3.93
Tigard	$5.83
Tualatin	$4.00
West Linn	$5.89 ($10.31 in July 2014)
Wilsonville	$4.00
Average	$3.74

In the case that Newberg implemented a street utility fee, we ran the budgetary analysis using a $6 street utility fee, which would provide an additional $336,000 annually to the maintenance budget. At a total annual budget of $486,000, the PCI would decrease from 73 to 64 by the year 2022. The total cost over the next nine years, including the funded and unfunded M&R cost is $24.8M. With supplementary funding, the City could reduce the back log by $3.1M when compared to the current projected budget of $150,000 annually. Table 5 summarizes the results of the analysis.

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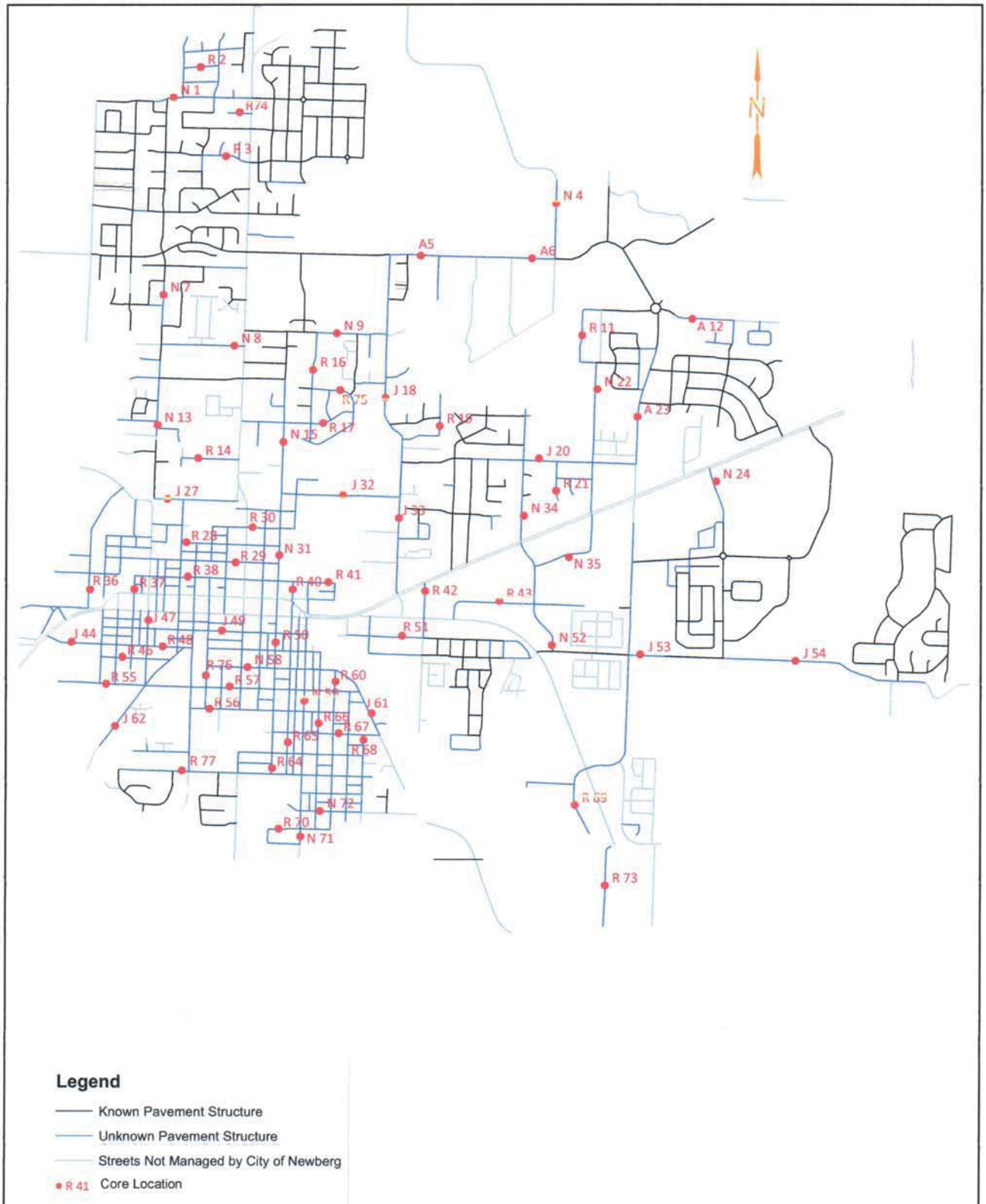
Exhibit A to
Resolution No. 2014-3156



Legend

- Known Pavement Structure
- Unknown Pavement Structure
- Streets Not Managed by City of Newberg
- R 41 Core Location

Scale: 1-inch = 1,500 feet

PAVEMENT SERVICES, INC.
INNOVATIVE PAVEMENT SOLUTIONS

Date: 3/28/2014 Job No.: 13075

Pavement Core Locations
Newberg, Oregon

FIGURE
11

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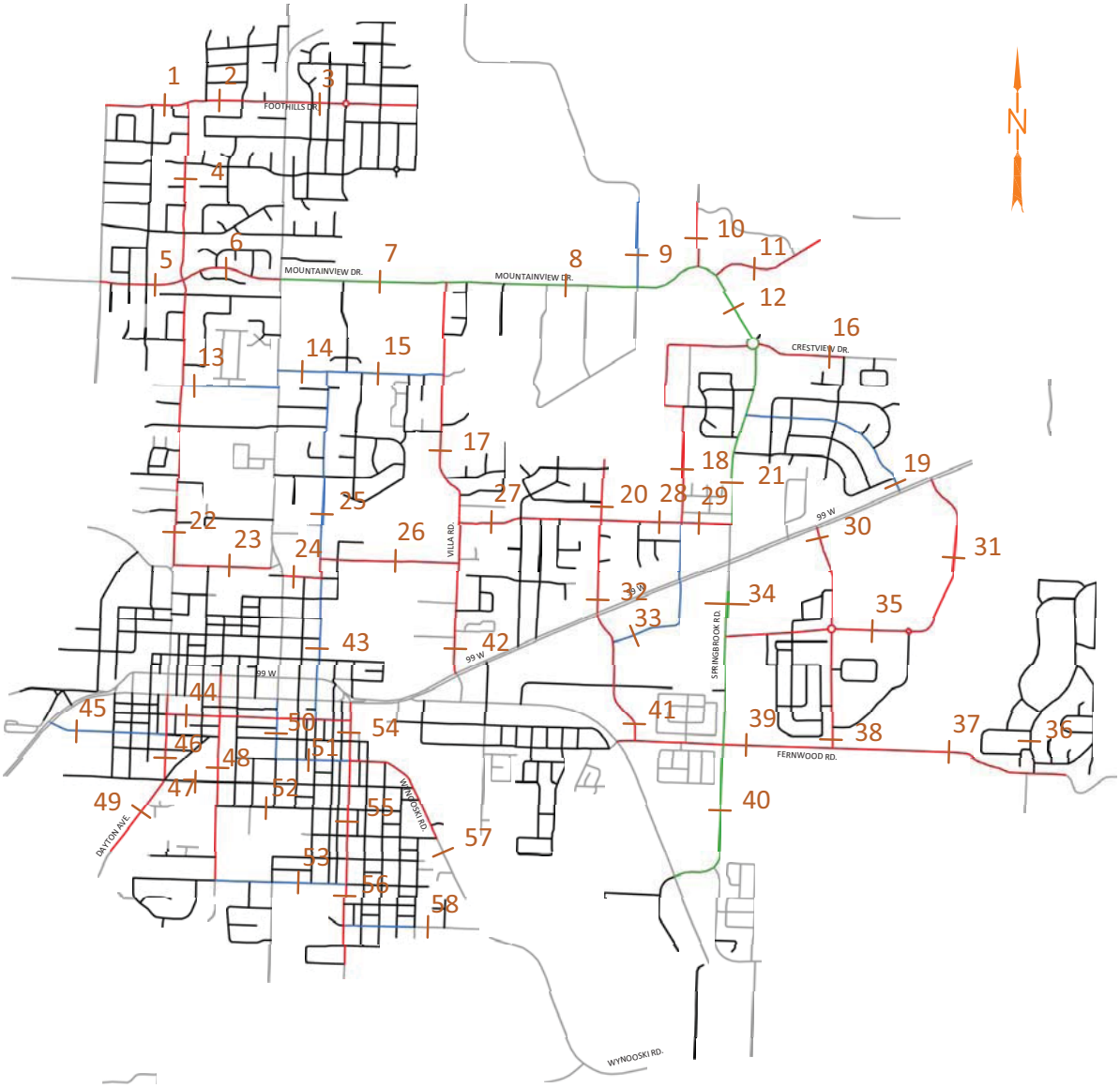
Exhibit A to
Resolution No. 2014-3156



LEGEND

- Major Collector
- Minor Arterial
- Minor Collector
- Residential
- Not Surveyed
- 1 TRAFFIC COUNT LOCATION

Base Map: City of Newberg GIS map of functional classification

Scale: 1-inch = 1,600 feet

PAVEMENT SERVICES, INC. *INNOVATIVE PAVEMENT SOLUTIONS*	**TRAFFIC COUNT LOCATIONS** **Newberg, Oregon**	FIGURE 12
Date: 1/27/2014 Job No.: 13075		

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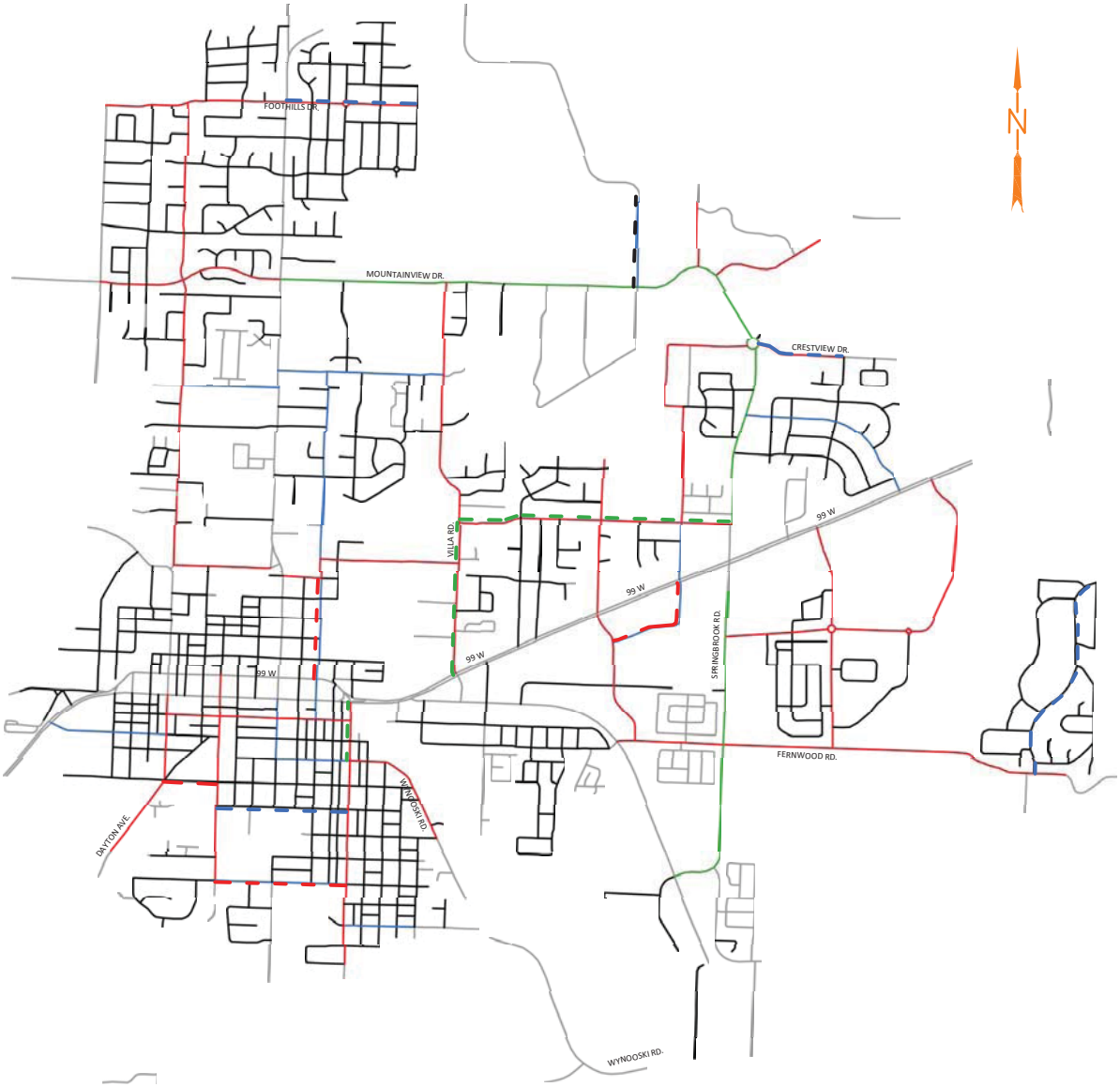
Exhibit A to
Resolution No. 2014-3156



LEGEND

Current FFC	Recommended Change to FFC
Major Collector	Major Collector
Min r Arterial	Minor Arterial
Minor Collector	Minor Collector
Residential	Local
Not Surveyed	

Scale: 1-inch = 1,600 feet

Base Map: City of Newberg GIS map of functional classification

PAVEMENT SERVICES, INC.
INNOVATIVE PAVEMENT SOLUTIONS

Date: 3/27/2014 Job No.: 13075

Map of Proposed Changes to Current Functional Classifications
Newberg, Oregon

FIGURE 15

SUMMARY

The overall pavement condition of the streets in Newberg is GOOD. This average rating does not represent the areas in the city where there is advanced deterioration which may require complete reconstruction. With the decreasing annual budget for pavement maintenance, it will become significantly more difficult to rehabilitate pavements in poor condition. Currently, at a yearly budget of $150,000, the City will only able to perform a minimum amount of maintenance. Now is the time to look into additional funding to supplement the current budget.

PSI conducted the budget analysis based on a preservation philosophy as opposed to a worst-first methodology. The worst-first strategy is a suboptimal method because M&R work is only applied after the pavement has structural damage. Once a pavement has significant structural damage, the only repair option is reconstruction. Preservation, on the other hand utilizes optimum timing to perform preventive treatments such as crack sealing, surface seals, and hot-mix asphalt thin overlays.

Four budget scenarios were evaluated for the time period of 2014-2022. A summary of the four budgetary scenarios is shown in Table 12.

Table 12 – City of Newberg Budget Scenarios

	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	Avg.$2.85M/Year, Eliminate Backlog	73	$25,468,902	$0	$25,468,902	85
2	$150,000/Year, Maintain Current Budget	73	$1,323,585	$24,475,671	$25,799,256	61
3	Current Budget + $336,000 Supplementary Funding ($486,000/Year)	73	$4,352,243	$20,428,549	$24,780,791	64
4	$1.89M/Year, Maintain Current PCI	73	$18,155,577	$9,779,761	$27,935,338	74

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

We recommend that the City of Newberg increase annual pavement maintenance funding. At the current funding level, the average condition of the street system will fall from 73 to a 61 by 2022 based on our analysis. By increasing funding to approximately $486,000 annually, the average PCI will only fall to a 64 in the year 2022, which keeps the average condition of the entire system above the critical PCI. As pavements that are in good condition continue to deteriorate, they will become increasingly more expensive to maintain. If preservation activities can be funded now, the cost of maintaining the pavements over their lifetime will be minimized.

Additionally, we recommend that the City perform routine pavement condition surveys every three years. Regular PCI surveys provide up-to-date information to the City staff and allow the

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most cost-effective use of maintenance and rehabilitation dollars.

Our analysis of the traffic counts performed during the project found that 14 of 58 locations had increased traffic volumes when compared to streets with similar classifications. We recommend that the City revise the federal functional classification for the streets shown in Table 9.