

BILL NO. 2019-004

ORDINANCE NO. 8253

A SPECIAL ORDINANCE OF THE CITY OF NEVADA, MISSOURI ACCEPTING THE BID AND AUTHORIZING THE EXECUTION OF AN AGREEMENT WITH INFRASTRUCTURE MANAGEMENT SERVICES, LLC, OF TEMPE, ARIZONA FOR A PAVEMENT CONDITION SURVEY.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF NEVADA, MISSOURI, THAT:

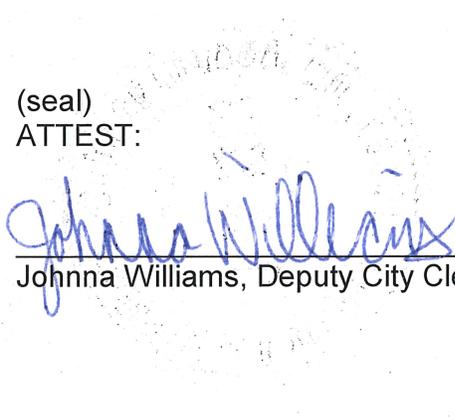
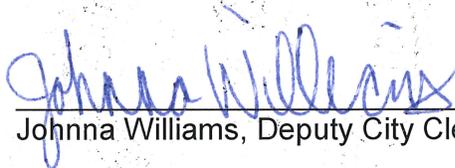
Section 1. The construction agreement between the City of Nevada, Missouri, and Infrastructure Management Services, LLC, of Tempe, Arizona, attached hereto and incorporated herein by reference is hereby approved.

Section 2. The City Manager is authorized and directed to execute the same on behalf of the City of Nevada, Missouri, and is authorized to take all reasonable steps necessary to comply with the terms of the agreement.

Section 3. This ordinance shall be in full force and effect from and after its passage and adoption.

PASSED, APPROVED AND ADOPTED by the City Council of the City of Nevada, Missouri, this 22nd day of January, 2019.

(seal)
ATTEST:



Johnna Williams, Deputy City Clerk


Brian L. Leonard, Mayor

AGENDA ITEM
January 8, 2019

Subject: Pavement Condition Survey

Department: Street

Bids were solicited to perform a Pavement Condition Survey to determine the structural integrity and overall riding quality of our City streets. We received bids from five (5) qualified vendors.

Contractor	Bid
PMG, Branson	\$17,550.00
IMS, Tempe, AZ	\$24,990.00
ERI, Savoy, IL	\$25,870.00
Allgeier Martin, Joplin	\$36,325.00
APAC, Springfield	\$37,000.00

The lowest and best bid was from Infrastructure Management Services, LLC, of Tempe, Arizona in the amount of \$24,990.00. IMS will provide additional technical resources and use more specialized equipment than PMG.

Street & Pavement Survey RFP

Company	Location	GIS Included	Field Survey Type	Est Completion	Provide Est Repair Cost	Provide Maintenance Plan	Cost
PMG	Branson, MO	Yes	Manual	4 Months	Yes	Yes	\$17,550
IMS	Tempe, AZ	Yes	Vehicle	5 Months	Yes	Yes	\$24,990
ERI	Savoy, IL	Yes	Vehicle	4 Months	Yes	Yes	\$25,870
Allgeier Martin	Joplin, MO	Yes	Manual	3 Months	Yes	Yes	\$36,325
APAC	Springfield, MO	No	Manual	4 Weeks	No	No	\$37,000

Attachment B - Project Schedule



IMS Infrastructure Management Services
1820 W Drake Drive, Suite 104, Tempe, AZ 85283
Phone: (480) 839-4347 Fax: (480) 839-4348
www.imsanalysis.com

To: Mark Mitchell, CIO

Date: December 18, 2018

From: Jeff Myers, MSA, Client Services
Manager

Project: City of Nevada 019 Pavement
Analysis and Inventory
Services

Subject: Project Schedule

Project No.: N/A

Currently IMS has a total capacity to complete 2,500 miles/month based on urban surveys, so completing the Nevada survey in a timely fashion is not an issue. Field surveys are expected to progress at a conservative rate of 25 to 35 miles per day. Surveys usually proceed at 5.5 to 6 days per week depending on weather, congestion, and statutory holidays. Elapsed time for the City of Nevada field surveys is estimated at **1 week**. IMS has the necessary staff, equipment, and availability to complete this assignment in a timely manner for the City of Nevada.

On all projects three rate-determining functions rise to the top as being critical in maintaining the proposed project schedule. In general, it is not the surveys that take the longest time, but rather handling the data that causes project schedules to slide. The three steps we wish to highlight, so they can be addressed by the City are:

- Finalizing the inventory and maps to be used for the field surveys.
- Review of the field data and exceptions reports delivered to the clients.
- Obtaining feedback and acceptance of the final format and load.

Task Activity	February				March					April				May				June			
	4	11	18	25	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
Project Initiation																					
Project Award & Notice to Proceed	█																				
Project Initiation & Scope Confirmation	█	█	█																		
GIS Review & Validation				█	█	█	█														
Survey Routing & Mapping						█	█	█	█												
Field Surveys																					
RST Mobilization & Calibration								█	█	█											
RST Field Data Collection										█											
Data Management																					
Data QA/QC, Processing, & Format											█	█	█	█							
Data Supply & Client Review															█	█					
ESA Data Load & Integration															█	█					
Pavement Analysis & Reporting																	█	█	█	█	
Optional Onsite Results Pres. and Software Trng																				█	█

CONSULTANT SERVICES AGREEMENT

REFERENCE ID: ___18

This AGREEMENT, effective this 18 day of December 2019, is by and between:

City of Nevada, MO
110 South Ash St.
Nevada, MO 64772

Hereinafter called CLIENT, and

IMS Infrastructure Management Services, L.L.C
1820 W. Drake Drive, Suite 104
Tempe, AZ 85283

Hereinafter called CONSULTANT, who agree as follows:

PART I - RECITALS

CLIENT desires to engage CONSULTANT to provide professional consulting services to complete a comprehensive pavement condition survey for the City of Nevada as described in the attached "Nevada IT Service RFP Response", and to render its services in the terms and conditions provided in this agreement.

Both CLIENT and CONSULTANT agree that execution of this AGREEMENT is a material element of the consideration to execute the Services. Additional terms and conditions may be added or changed only by written amendment to this AGREEMENT signed by both parties. In the event CLIENT uses a purchase order or other form of documentation to administer this AGREEMENT, the use of such form shall be for convenience purposes only and any additional or conflicting terms it contains are stricken. This AGREEMENT shall not be assigned by either party without prior written consent of the other party.

In consideration of the rights and obligations hereinafter specified, CLIENT and CONSULTANT agree as follows:

PART II - SCOPE OF SERVICES

The scope of CONSULTANT's services ("Services") and project deliverables are described in the "Nevada IT Services RFP Response", the contents of which shall be incorporated into this AGREEMENT.

PART III - COMPENSATION

CLIENT shall pay compensation to CONSULTANT for the Services performed under this agreement according to the fee schedule, or unit rate table, presented in the "Nevada IT Services RFP Response". If no fees are stated, fees will be according to CONSULTANT's current fee schedule. Fee schedules are valid for the calendar year in which they are issued.

CONSULTANT may invoice CLIENT at least monthly and payment is due upon receipt of invoice. The Invoice shall follow the fee schedule and be based on percentage complete or other agreed upon milestones. Documentation in the form of a project status spreadsheet shall be supplied in support of each invoice. No withholdings shall be made. CLIENT shall notify CONSULTANT in writing, at the address above, within 10 business days of the date of the invoice if CLIENT objects to any portion of the charges on the invoice, and shall promptly pay the undisputed portion.

CLIENT shall pay a finance fee/late fee of 1.5% per month, but not exceeding the maximum rate allowed by law, for all unpaid amounts 15 days or older. CLIENT agrees to pay all collection-related costs that CONSULTANT incurs, including attorney fees. CONSULTANT may suspend services for lack of timely payment.

PART IV - PROVISIONS

1. PERIOD OF SERVICE - Work shall be initiated upon written authorization from CLIENT or execution of this agreement. The contract shall remain in force until the project is completed and notification of completion is submitted by CONSULTANT to CLIENT or December 31st, 2019 – whichever comes first.
2. WARRANTY – CONSULTANT warrants to CLIENT that it will perform the services in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. CONSULTANT MAKES NO OTHER WARRANTIES OR GUARANTEES, EXPRESSED OR IMPLIED, RELATING TO CONSULTANT’S SERVICES OR SOFTWARE PROVIDED BY OTHERS, AND CONSULTANT DISCLAIMS ANY IMPLIED WARRANTIES OR WARRANTIES IMPOSED BY LAW, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
3. CONSEQUENTIAL DAMAGES – CONSULTANT SHALL NOT BE LIABLE TO CLIENT FOR LOSS OF PROFIT OR REVENUE, LOSS OF USE OR OPPORTUNITY; LOSS OF GOOD WILL; COST OF SUBSTITUTE FACILITIES, OR SERVICES; COST OF CAPITAL OR FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT, PUNITIVE, OR EXEMPLARY DAMAGES.
4. INDEMNIFICATION – CONSULTANT shall defend, indemnify, and hold harmless CLIENT, their agents, officers, members and employees, from and against legal liability for all claims, losses, damages, and expenses to the extent such claims, losses, damages, or expenses are caused by CONSULTANT’s negligent acts, errors, or omissions. The maximum amount of any claims, losses, damages, or expenses shall not exceed the value of the AGREEMENT. In the event such claims, losses, damages, or expenses are caused by the joint or concurrent negligence of CLIENT and CONSULTANT, they shall be borne by each party in proportion to its own negligence under comparative fault principles.
5. INSURANCE - CONSULTANT represents that it now carries, and will continue to carry the following minimum insurance applicable to the project.

Type of Insurance	Limits Of Liability
Commercial General Liability	\$1,000,000 (per occurrence)
Automobile Liability	\$1,000,000
Workers Compensation	As per applicable state law

6. GOVERNING LAW – The laws of the State of Arizona shall govern the interpretation and enforcement of this contract. Any litigation which arises between the parties shall be initiated and pursued in the District Court in and for Maricopa County, State of Arizona.
7. SEVERABILITY – Any provision of the AGREEMENT which may be rendered null and void shall not invalidate the remainder of this AGREEMENT to the extent the AGREEMENT is capable of execution.
8. TERMINATION - Either party may terminate this AGREEMENT or the Services without cause upon giving the other party ten (10) calendar days written notice. In such case, CONSULTANT shall be paid costs incurred and fees earned to the date of termination, loss of profit plus reasonable costs of closing the project.

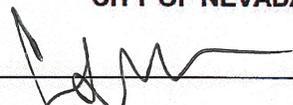
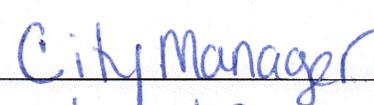
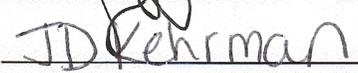
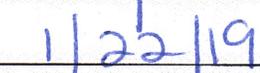
9. CONFIDENTIALITY - CLIENT and CONSULTANT agree not to disclose any confidential or proprietary information of the other to any person unless requested in writing from the other to do so, and to bind its employees, officers and agents to this same obligation.
10. OWNERSHIP OF DOCUMENTS – Work product, such as field data, analyses, calculations, notes and other records relating to the project prepared by CONSULTANT shall remain CONSULTANT property. The CLIENT shall have use of the work product and software for the sole benefit of CLIENT with no third party beneficiaries intended. Reliance upon the Services and any work product is not intended for third parties. Files shall be maintained for a period of one (1) year by CONSULTANT.
11. SAFETY - Safe practices are to be considered a priority requirement in the performance of this AGREEMENT. CONSULTANT will comply with the provisions of Federal, State and local health and safety requirements.
12. NON-DISCRIMINATION IN EMPLOYMENT - CONSULTANT agrees and hereby certifies that in providing the services hereunder, it shall not discriminate against any employee or applicant because of race, color, religion, age, sex, or national origin. CONSULTANT shall abide by provisions of all applicable governmental regulations pertaining to non-discrimination.
13. NOTICES – All notices hereunder materially changing this AGREEMENT must be in writing to the designated CLIENT contact and CONSULTANT project manager.
14. FORCE MAJEURE – Neither CLIENT nor CONSULTANT shall be considered in default in the performance of its obligations hereunder if such obligations were prevented or delayed by any cause beyond the reasonable control of the party which include, but are not limited to acts of God, labor disputes or civil unrest.
15. ADDITIONAL TERMS - None.

PART V - SIGNATURES

The parties have caused this AGREEMENT to be executed in duplicate counterparts, each of which shall be considered as an original by their duly authorized offices.

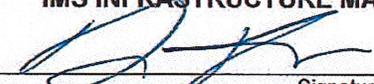
CLIENT: CITY OF NEVADA, MO

By:

 <hr/> Signature	 <hr/> Title
 <hr/> Printed Name	 <hr/> Date

CONSULTANT: IMS INFRASTRUCTURE MANAGEMENT SERVICES, LLC

By:

 <hr/> Signature	Firm Principal <hr/> Title
Derek Turner, MBA <hr/> Printed Name	December 18, 2018 <hr/> Date

IMS IMS Infrastructure Management Services

Consultants | Engineers



Technical Proposal

**“Pavement Condition Survey RFP”
“Request for Proposals Pavement Condition Survey”**

October 16th, 2018 - 12:00 PM

**Attn: Mark Mitchell
City of Nevada
110 S Ash
Nevada, MO 64772**

IMS Office Location

1820 W Drake Drive, Suite 104
Tempe, AZ 85283
(480) 839-4347 ph
(480) 839-4348 fax

consulting
engineering
data collection
software

www.imsanalysis.com



IMS Infrastructure Management Services
1820 W Drake Drive, Suite 104 Tempe, AZ 85283
Phone: (480) 829-4347 Fax: (480) 839-4348
www.imsanalysis.com

October 16th, 2018

City of Nevada
110 S. Ash
Nevada, MO 64772

Attention: Mark Mitchell, CIO, City of Nevada

Reference: Pavement Condition Survey RFP "Request for Proposals Pavement Condition Survey City of Nevada
October 2018"

Dear Evaluation Committee:

IMS Infrastructure Management Services is pleased to submit this proposal regarding the above referenced project to the City of Nevada. With over 30 years of pavement and asset management experience, we have become international leaders in the provision of data collection methodologies and software configuration. With our sole focus on pavement and asset management services, Nevada Staff will acquire **quality** data, exemplary **service**, and **reliability** that define our commitment. We pride ourselves on never having any disciplinary action or complaint with IMS, or any of our principals or associates. We are free of any and all conflicts of interest with the City of Nevada, its officers, agents, and/or employees. Our strict confidentiality concerning this or any projects in the future is guaranteed.

The official contact person for any questions regarding the IMS proposal is:

Zac Thomason – National Manager of Client Services

IMS Infrastructure Management Services, LLC
1820 W. Drake Drive, Suite 104, Tempe, AZ 85283
Office: (480) 839-4347, Direct: (480) 462-4043, Fax: (480) 839-4348
Email: zthomason@imsanalysis.com

We want to thank you for the opportunity to assist the City of Nevada with its pavement management needs. Based on careful review of the project scope, we are confident that we can provide the City with the requested services in a cost effective and time efficient manner that will provide a return of substantial savings. Thank you for your time and consideration.

Regards,

IMS Infrastructure Management Services

Zac Thomason
National Manager of Client Services



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1.0 FIRM QUALIFICATIONS AND EXPERIENCE

1.1 EXECUTIVE SUMMARY

IMS Infrastructure Management Services is the premier pavement and right-of-way asset management firm in the Midwest as we have completed projects in Bridgeton, Branson, Springfield, Creve Coeur, Kirksville, St. Charles, MO; Leawood, Wyandotte County, KS; and many others listed throughout this proposal. With 50 – 60 pavement management assignments completed annually, we stand second to none in our ability to establish cost effective maintenance management programs using industry standard deliverable formats such as Interactive Excel Spreadsheets,



GIS geodatabases, simple to use Google Earth KML mapping files, and even 3rd party pavement management systems such as MicroPAVER, StreetSaver, Lucity, CarteGraph, and many others.

The primary objective of this project is to provide the City with the tools, skills, and information to manage their roadway network in the most cost effective manner that provides the ratepayers of Nevada with the optimal blend of level of service and annual expenditures. To accomplish this goal, IMS will conduct field surveys utilizing **ASTM D6433** protocols (U.S. Army Corps of Engineers data collection protocols) that will provide a solid understanding of the status and needs of the roadway network. IMS will mobilize the Laser Road Surface Tester (RST) for the surface distress surveys network wide. The data can then be harnessed to develop comprehensive multiple-year street rehabilitation plans that optimize pavement quality and minimize annual expenditures.

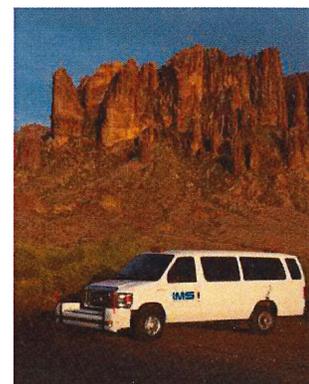
While the IMS team will assess the City's existing pavement management data and evaluate several alternative software options (i.e. MicroPAVER, StreetSaver, Lucity, CarteGraph, etc.), IMS recognizes that not all Cities have the resources to run a dedicated pavement management program. As such, IMS has engineered an easy to use Interactive Excel Spreadsheet (ESA – Easy Street Analysis) that utilizes the core metrics of any good pavement management system such as industry standard performance curves, **ASTM D6433** distress protocols, custom prioritization, and cost benefit optimization. There is no "one-size-fits-all" when it comes to pavement management programs and IMS can assist the City in the evaluation and selection of an appropriate software solution that meets City needs and desires.

This proposal will highlight the following activities:

- The IMS team's innovative approach to objective **ASTM D6433** automated data collection.
- Assess the City's existing pavement management data and evaluate suitable 3rd party software candidates (StreetSaver, Lucity, Cartegraph, etc.), including "LIVE" spreadsheet solutions.
- Collaboration with City staff and an iterative analysis process designed to fine-tune the results to meet Nevada's specific level of service needs.
- Development of a comprehensive 5-year rehabilitation plan that is flexible enough to accommodate innovative paving solutions and rehabilitation strategies.

1.2 COMPANY PROFILE

IMS Infrastructure Management Services is a pavement management-consulting firm with over 30 years of direct experience in the industry and we are the premier automated pavement management firm in the United States. As a professional engineering firm that is 100% dedicated to pavement and asset management, our ability to perform the work goes hand-in-hand with our philosophy on project ownership. Every project is assigned a team of dedicated professionals, with the core group comprised of a Project Principal, Project Engineer, and Client Services Manager. We can ensure successful project ownership because each member of the IMS team understands who is accountable for each phase of the project.



Since our inception in 1985, IMS has progressively developed new technologies together with real-world software applications to become a recognized international leader in the field of pavement and infrastructure management. Our software solutions provide the tools required to meet the complex challenges within modern urban and rural environments.

IMS completes 50 to 60 pavement and asset management projects across the U.S. annually and has served as the pavement management firm for the nearby agencies of Bridgeton, Branson, Springfield, Creve Coeur, Kirksville, St. Charles, Missouri; Hutchinson, Hays, Bonner Springs, Leawood, Wyandotte County, Kansas; Broken Arrow, Edmond, Ada, and Stillwater, Oklahoma. IMS takes pride in performing quality work for each client to build long-term partnerships. Our team is comprised of 35 employees, broken down as follows: 12 Staff Professionals, 9 Support Personnel, and 14 Technicians.

A brief history of IMS is as follows:



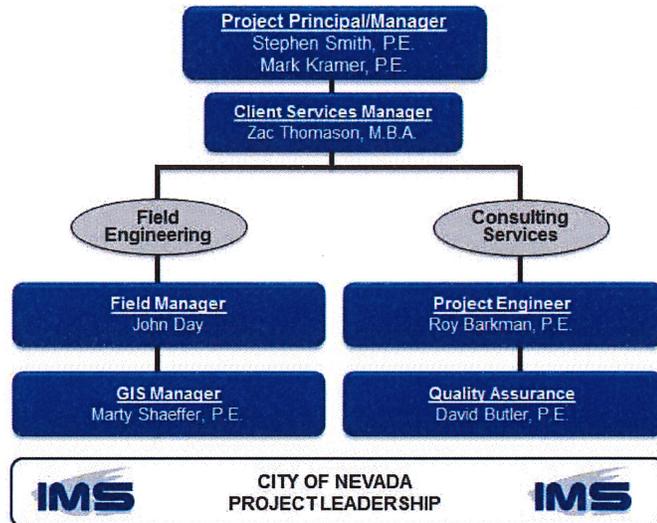
Since 2004, IMS has completed more than 700 pavement management assignments for government agencies and private-sector companies throughout North America. IMS achievements include:

- Certified for **ASTM D6433** data collection and participation in *ASTM sub-committee E1741* and *TRB subcommittee AFD20* on pavement monitoring and valuation.
- 750 City and County agencies plus 25 large-scale public works departments.
- Ten state agencies, DOT's, MPO's and COG's, and transportation authorities.
- Collected data for more than 15 different software platforms, ranging from our own proprietary systems, to 3rd party programs including PAVER, Lucity, Cartegraph, Cityworks, and others.
- Developed the data collection tools that set the standard for comprehensive automated and objective surveys.

1.3 IMS TEAM ORGANIZATION AND LEADERSHIP

The IMS team is built around a core group of key project members that stay with the project from inception through to delivery of the final results. It is where decisions are assessed, implemented, and follow-up completed. The project will be led by Project Principal, Stephen Smith, and includes multiple registered professional engineers. The core team, led by Stephen Smith, P.E. Principal, also includes David Butler, P.E. as the Quality Assurance Manager, Zac Thomason, M.B.A. as the Client Services Manager.

The team has been structured into two streams that follow the logical work activities and flow of the project. Each work stream is headed by a specialist in their respective field of practice. For this assignment, activities relating to the acquisition and quality of field data are undertaken and managed by David Butler. David was selected for this role due to his 250,000 miles and over 30 years of technical data management experience. John Day will coordinate the RST field program and implement the initial data processing preparations. Marty Shaeffer will manage the GIS linkage and optional



activities such as asset inventories and image deliverables. Roy Barkman, P.E. and David Butler, P.E. will manage the post-processing routines, pavement condition data formatting, and verification programs.

We purposefully separated the field surveys from the data management and consulting functions in order to ensure the continual flow of data from the field, through post processing, and then on to the client. We believe that the person who collects the data cannot be the same one who validates the data.

The entire team will operate under the direction of Principal Engineers Stephen Smith and Mark Kramer. This project organization has been intact at IMS for over 15 years, providing a team approach that is proven and effective in delivering customized pavement management programs. The IMS team is organized and based on a few mission critical items:

- The Principals can bring on additional resources as necessary and react to on-going project challenges in a timely fashion.
- Nearly 100 years of engineering and project management experience with a focus on pavement and right-of-way asset data collection projects. IMS staff has experience in roadway design, construction, municipal engineering and pavement analysis puts him in a strong position to develop real world solutions and budgets.
- IMS staff understands the need and constraints of the modern public agency. Our knowledge of industry software modules, their strengths and weaknesses, will provide the City with a unique perspective on the implementation of a Pavement Management System.



1.4 TECHNICAL STAFF QUALIFICATIONS

The project roles, qualifications, and responsibilities of the key team members are highlighted and summarized below.

Team Member

Project Role & Experience

Stephen Smith, P.E.

Project Principal

Summary:

18 Years with IMS

Automated Data: Yes

Pavement Management: Yes

Software Evaluation: Yes

ROW Assets: Yes

Software Implementation: Yes

P.E. in 3 States

Responsible for ensuring technical resources are available for the data collection and processing, and then directly involved with the pavement analysis and reporting. Stephen will be integral throughout the analysis and reporting phase. Stephen will also ensure that the project remains on time and that the final report is reviewed with City staff.

- *B.S. in Civil Engineering, over 30 years engineering experience.*
- *P.E. in Arizona, Delaware and P.Eng. in Alberta and Saskatchewan.*
- *18 years specializing in pavement and right of way asset management for cities and counties.*
- *In excess of 100 pavement and right of way asset management and implementation projects in the last 5 years. Most involve development of inventories, GIS integration, analysis and reporting, and asset management systems.*
- *In excess of 300,000 miles of data collection and QA/QC using automated, manual and sampling technologies.*

Recent projects include: Branson, Springfield, Kirksville, & Creve Coeur, MO; Bonner Springs, Leawood, Hutchinson, Manhattan, Wyandotte County & Hays KS; Oklahoma County, Broken Arrow, Norman, Bartlesville, Ada & Edmond, OK; Eules, Pearland, Huntsville, Flower Mound, Carrollton, Beaumont, Denton, Keller, Weatherford & Travis County, TX.

David Butler, P.E.

Sr. Engineer

Quality Assurance Manager

Summary:

32 Years with IMS

Automated Data: Yes

Pavement Management: Yes

Software Evaluation: Yes

ROW Assets: Yes

Software Implementation: Yes

P.E. in 7 States

David is responsible for ensuring the prepared inventory and processed pavement condition data meets IMS's rigorous QA standards. He works closely with the Project Engineer to ensure the data meets the deliverable requirements. Should the City select to perform sub-grade data collection, he will implement the QA/QC process for the surveys.

- *B.S. in Civil Engineering, over 30 years engineering experience.*
- *Over 25 years specializing in pavement and right of way asset condition surveys, software implementation, analysis, and training.*
- *Data collection, inspection and QA/QC of well over 200,000 miles of roadways in all regions of the country.*
- *Participation in ASTM sub-committee E1741, TRB sub-committee AFD20 on pavement monitoring, valuation.*

Recent projects include: Branson, Springfield, Kirksville, & Creve Coeur, MO; Bonner Springs, Leawood, Hutchinson, Manhattan, Wyandotte County & Hays KS; Oklahoma County, Broken Arrow, Norman, Bartlesville, Ada & Edmond, OK; Pearland, Huntsville, Flower Mound, Denton & Weatherford, TX.



Marty Shaeffer, P.E.**GIS & ROW Manager**Summary:

12 Years with IMS

3rd Party Software: Yes

GIS: Yes

Software Evaluation: Yes

ROW Assets: Yes

Marty is a professional engineer who has spent the last 17 years dedicated to GIS technology. He is responsible for ensuring accurate linkage of the IMS data to the City's existing GIS and works closely with the Project Engineer. Marty also facilitates the processing of RST imagery and the development of image deliverables and ROW asset inventories.

- *B.S. in Civil Engineering, 27 years engineering experience.*
- *15+ years specializing in GIS mapping.*
- *P.E. in California, New Mexico, & Arizona.*
- *Registered AutoCAD Developer and member of the American Society of Civil Engineers.*

Recent projects include: Branson, Springfield, Kirksville, & Creve Coeur, MO; Bonner Springs, Leawood, Hutchinson, Manhattan, Wyandotte County & Hays KS; Oklahoma County, Broken Arrow, Norman, Bartlesville, Ada & Edmond, OK; Eules, Pearland, Huntsville, Flower Mound, Carrollton, Beaumont, Denton, Keller, Weatherford & Travis County, TX.

Roy Barkman, P.E.**Project Engineer**Summary:

6 Years with IMS

3rd Party Software: Yes

Automated Data: Yes

Pavement Management: Yes

Software Evaluation: Yes

ROW Assets: Yes

Roy will be responsible for ensuring the facilitation of data throughout the entire project. His responsibilities begin with ensuring accurate network referencing and end with the processing of raw field data into meaningful results.

- *B.S. in Civil Engineering*
- *7+ years of municipal and private firm experience focused on asset management, roadway design, and land development*
- *P.E. in Arizona*

Recent projects include: Branson, Springfield, Kirksville, & Creve Coeur, MO; Bonner Springs, Leawood, Hutchinson, Manhattan, Wyandotte County & Hays KS; Oklahoma County, Broken Arrow, Norman, Bartlesville, Ada & Edmond, OK; Eules, Pearland, Huntsville, Flower Mound, Carrollton, Beaumont, Denton, Keller, Weatherford & Travis County, TX.

Zac Thomason, M.B.A.**Client Services Manager**Summary:

12 Years with IMS

3rd Party Software: Yes

Automated Data: Yes

Pavement Management: Yes

Software Evaluation: Yes

ROW Assets: Yes

Zac is responsible for overall project and client management activities. He develops the project scope, schedule, team, and ensures the scope is adhered to throughout the project. Zac works very closely with the Project Principal and is considered a primary point of contact for our clients.

- *B.S. in Global Business from Arizona State University*
- *Master's in Business Administration*
- *12+ years of project management experience in the engineering industry.*
- *Has led over 150 successful pavement management assignments.*

Recent projects include: Branson, Springfield, Kirksville, & Creve Coeur, MO; Bonner Springs, Leawood, Hutchinson, Manhattan, Wyandotte County & Hays KS; Oklahoma County, Broken Arrow, Norman, Bartlesville, Ada & Edmond, OK; Eules, Pearland, Huntsville, Flower Mound, Carrollton, Beaumont, Denton, Keller, Weatherford & Travis County, TX.

1.5 PROJECT PROFILES AND REFERENCES

With over 30 years of dedicated pavement management experience, IMS as an organization has completed similar assignments all across the United States. Since 2004 alone, IMS has completed over 750 pavement management assignments. Some of our local focus in Missouri and Kansas has been with Kirksville, Creve Coeur, Bridgeton, Saint Charles, Branson, Springfield, Wyandotte County, Bonner Springs, Hutchinson, Leawood, and many others. In addition, IMS was recently awarded a pavement management implementation assignment in Fayetteville, Arkansas.

Our philosophy is based on the provision of quality pavement condition data for the implementation of multiyear pavement management plans. IMS serves as the dedicated pavement and asset management firm for municipalities large (Atlanta, GA) and small (Bonner Springs, KS). As a firm dedicated to pavement management, Nevada can rest assured that the end-users will receive quality pavement condition data for the development of the long-term and defensible rehabilitation programs. Presented below are a few projects illustrating IMS' capabilities to implement and update comprehensive pavement management systems.



Wyandotte County, KS: Awarded to IMS in 2017, the Wyandotte County scope of services has been developed to include data collection and the delivery into their Lucity application. In 2017, IMS mobilized the Laser RST to survey all of the County's roadways, approximately 1,902 linear miles. The IMS team performed a comprehensive pavement and asset management implementation program that includes pavement data collection, Lucity integration, GIS/Lucity clean up services, pavement analysis modeling, and development of a 5-year pavement analysis.

City of Springfield, MO: In 2016, IMS and the City of Springfield teamed to complete a pavement management program update for the City's network. IMS performed a pavement condition analysis covering the City's 1040 miles of roadways. IMS mobilized the Laser RST to collect ASTM D6433 condition data to return to City staff for their analysis efforts. IMS teamed up with the City again in 2017, and is in the process of completing a full sidewalk condition assessment project for the entirety of the City's 700 mile network.

Additional Regional projects recently performed by IMS include:

- Hutchinson, KS
- Hays, KS
- Wyandotte County, KS
- Johnson County, KS
- Manhattan, KS
- Shawnee, OK
- Enid, OK
- Oklahoma County, OK
- Edmond, OK
- Norman, OK
- Bartlesville, OK
- Stillwater, OK
- Ponca City, OK
- McAlister, OK
- Guymon, OK



References

The following are provided as a testament to our ability to provide quality asset management services.

City of Kirksville, MO (2016)

Contact: Ray Sandstrom, Street Supervisor

Email: rsandstrom@kirksvillecity.com

Phone: (660) 988-4325

In 2015, IMS partnered with the City of Kirksville to perform a pavement data collection project. IMS surveyed approximately 129 test miles for the City using the Laser RST. In addition to the data collection, our team also provided them with a subsurface analysis of their pavement strength; this was completed using our Dynaflect Device. After completion of the data collection and subsurface analysis, IMS provided the city with a comprehensive and robust pavement management report and analysis. The project was completed and delivered into the Interactive Spreadsheet, ESA. IMS also integrated drainage into the 5-year rehabilitation plan using City input.

City of Branson, MO (2015)

Contact: David Miller, P.E., City Engineer

Email: dmiller@bransonmo.gov

Phone: (417) 337-8542

In 2015, the City of Branson selected IMS for a pavement distress survey of approximately 142 miles of roadway. IMS performed data collection with the laser RST as well as sub-grade testing with the deflectometer. Roadway geometrics, curb and gutter assessment, right-of-way asset data, an ADA ramp inventory, and forward view imagery at 25-foot intervals was delivered and fully integrated with their GIS upon completion of the data processing phase of the project. IMS has loaded all of the City's pavement data into their Easy Street Analysis spreadsheet.

City of Bonner Springs, KS (2017)

Contact: Matt Beets, Project Manager

Email: mbeets@bonnersprings.org

Phone: (913) 667-1714

In 2017, the City of Bonner Springs selected IMS to implement a pavement management program. IMS surveyed the City's entire pavement network resulting in 97 test miles driven by the Laser RST. In addition to developing the pavement condition inventory, IMS delivered an analysis and report. After the field surveys were completed, the data was processed and formatted for loading into the IMS Easy Street Analysis application. The data was linked to the City's GIS and analyzed by IMS engineers. IMS implemented IMSvue, a browser based data viewing tool for the city. IMS staff then performed software training.

City of Broken Arrow, OK (2016)

Contact: Clint Myers, Engineering Technician

Email: cmyers@brokenarrowok.gov

Phone: (918) 259-7000

In 2016, IMS performed a pavement data collection project for the City of Broken Arrow and IMS surveyed approximately 780 test miles for the City using the RST. In addition to the Data collection, our team also provided the City with an up-to-date full sign and support inventory; this was completed using our HD (1980x1080) imagery. After completion of the data collection and ROW asset inventory development, IMS provided the city with a comprehensive and robust pavement management report and analysis, and loaded the data into the City's Lucity software.

2.0 PROJECT APPROACH

2.1 UNDERSTANDING THE SCOPE OF THIS ASSIGNMENT

Street Network Inventory & GIS Integration – The Nevada City street network consists of 63 centerline miles of roadway and IMS will perform a linear pavement distress survey on 100% of the paved roadway network length. For the Nevada assignment, the Laser RST will survey all arterial, collector, and divided streets in two passes, and the remaining network in a single pass, resulting in an approximate survey of **75 miles**. IMS will begin the project by adopting the City's existing pavement database (as available) and GIS in an effort to prepare the survey inventory for field data collection. New streets will be added and the City's pavement inventory will be reviewed to ensure it meets pavement management requirements. As requested, IMS will also develop the network wide segmentation on a logical block-to-block and intersection-to-intersection basis. The IMS surveys **are tightly coupled** with the City's existing GIS environment resulting in a seamless transition of data that is linked to a unique identifier in the City's GIS.

Objective Pavement Distress Survey – *IMS is unique to the industry, as an objective and repeatable ASTM D6433 pavement data collection effort will be completed.* Instead of using the subjective feet on ground or windshield sampling method, all data will be collected continuously and recorded in 100-foot intervals in the form of a detailed database complete with GPS coordinates. The detailed data will then be summarized at the segment level (intersection-to-intersection) to develop the pavement distress index for each roadway segment.



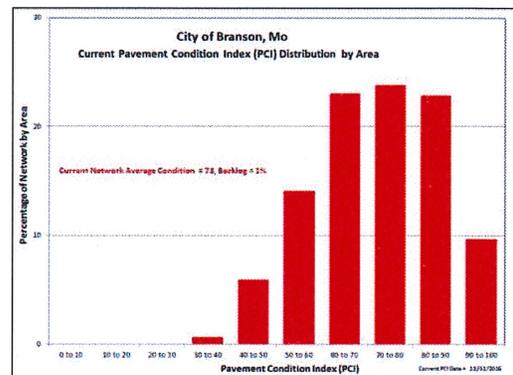
Advanced Technology – The laser camera array (LCA) contains 11 lasers capable of collecting automated pavement condition data in the form of roughness to International Roughness Index (IRI) standards, dual wheel path rutting, transverse cracking, block cracking, alligator cracking and texture. The Direct Digital Condition Rating System (DDCRS) is a touch screen tablet that allows the user to define what information (distresses, attributes, & asset information) is to be collected and how it is to be quantified.

HD Video – IMS can utilize up to seven GPS referenced HD camera views (1920x1080) for our QA/QC program, ROW asset inventory development, virtual drives, and/or other image deliverables. For the Nevada City project, IMS suggests a minimum of three HD cameras that will be proofed out prior to data collection. The views can include the Center Forward, Passenger Front, and Rear Downward views that can be utilized by the Project Engineer during the IMS QA/QC program. The Center Front view can be processed in 20 – 25 foot intervals and linked to GIS in the form of a Personal Geodatabase that will be delivered to the City. Additional views can be added at the discretion of City staff as well.

Data Processing, Formatting, and City Review – The condition data will be delivered to City staff into an easy to navigate Excel spreadsheet, complete with graphs and descriptive terms such as Good/Fair/Poor. The detailed PCI extent and severity distress data is also aggregated into an easy to understand 0-10 index to assist in City review. *The condition data is delivered as a Personal Geodatabase, a series of shape files, and KMZ files to ensure City staff comfort with the data outputs prior to the analysis.*

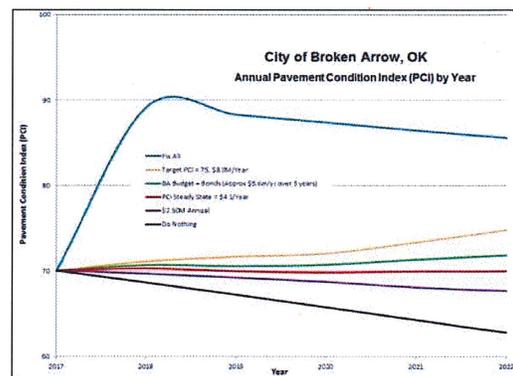
Pavement Analysis Configuration – While the parameters of the pavement analysis are largely driven by the City needs and survey data, the focus of this project is to develop a comprehensive multi-year rehabilitation plan that targets the City of Nevada maintained roadways, allowing City staff to prioritize roadways based on the need and priority. This function aids in allocating the correct funds to the streets that need rehabilitation the most.

A solid pavement management program will allow the rehabilitation plan to be prioritized based on City priorities as they relate to functional classification, pavement type, structural adequacy, and geography. The ability to also utilize deflection data and/or the sum of load associated surface defects (alligator, longitudinal, and edge cracking; rutting, distortions, and patching/potholes) for the development of the structural index (SI) is also beneficial. *In addition, the deterioration curves should be modeled for the City of Nevada with the integration of critical set points that catch roadways before they fall into a more expensive treatment category.*



This is how we introduce cost of deferment into municipal optimization techniques. While the parameters described above can be completed by the IMS Interactive Spreadsheet and select 3rd party applications, they cannot be adopted by applications such as MicroPAVER and/or StreetSaver which rely heavily on worst-first and scheduled activity prioritization.

Pavement Management Report – With the analysis complete and approved by City staff, IMS will aggregate the information into a bound report that reviews the concepts of pavement management, PCI calculations, condition results, network value, operating parameters of the analysis, budget scenarios, and multi-year pavement management reports. The analysis and report will go through several iterations of review before being finalized and presented to City staff.



IMS can also provide an onsite council presentation/workshop that educates elected officials on the benefits of pavement management and preventative maintenance. In addition, an IMS presentation reviews the results of the survey in an easy to understand manner such that all attendees can follow the logic of the project without having to be an expert. The idea is to simplify pavement management, not make it needlessly complicated and difficult to understand.

2.2 OBJECTIVE ASTM D6433 PAVEMENT DISTRESS ACQUISITION

The IMS fleet of pavement performance equipment includes four Laser Road Surface Testers, two Dynaflect Devices, and three Sidewalk Surface Testers. For this survey, we propose to use one Laser Road Surface Tester (RST) enhanced with HD digital imagery and GPS capabilities. The RST, with its 11 laser sensors is capable of collecting a full array of pavement condition data complete with high accuracy GPS coordinates and multiple view digital images for both rigid



and flexible pavements (in real time), as it traverses the roadway. An integrated Digital Condition Rating Subsystem supplements the RST data for additional distress data elements, quality assurance and inventory information. Specialized data processing, using GIS as its backbone, allows the pavement data to be quickly checked for completeness and quality.

The main components of the enhanced RST are:

- A transducer bar with an array of 11 laser cameras, rate gyroscopes, inclinometers and accelerometers to measure pavement roughness, rutting, cracking, and geometrics.
- Touchscreen DDCRS that is customized to collect a variety of roadway attributes and extent-severity based pavement distresses through trained operator input.
- Up to 7 HD digital cameras can be mounted for forward, side, downward, and right-of-way views.
- Ability to collect dual wheel path roughness to International Roughness Index (IRI) standards.
- High accuracy Global Positioning System (GPS) receiver with inertial navigation for geo-locating of pavement and asset information with excellent accuracy.
- Dual distance measuring instruments to measure linear distances to within +/- 0.5%.
- Built-in software and on-board processors to develop roadway inventories, time code integration, and system monitors.

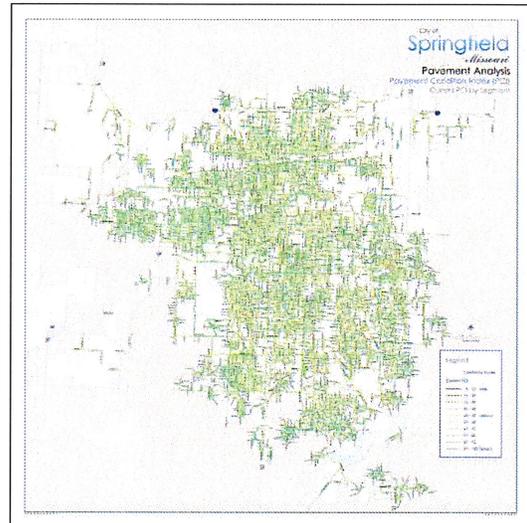
The Laser RST travels at the posted speed limit and thus does not affect the free flow of traffic. This is important as it allows IMS to:

- Collect data in a timely fashion without having to trade-off accuracy for production.
- Work from a safe, protected environment without risk to the data collectors.
- Eliminate the need to implement traffic control, close lanes or attempt to collect the data from the sidewalk or dodge traffic.
- Collect, validate, and safeguard large volumes of data without the need for transposing data from portable data collection units or paper.

The Laser Camera Array (LCA) also automatically collects transverse cracking, block cracking, alligator cracking, distortions, roughness, geometrics, and texture. The laser camera technology automatically detects cracks and minute variances in the pavement surface. Thus, the LCA greatly diminishes the subjective nature of PCI data collection performed by image-based surveys.

2.3 GIS INTEGRATION & MAPPING

The role of GIS in asset management cannot be overstated. It is a powerful tool that provides the ability to handle and present vast amounts of data in an efficient manner. Not only does GIS allow an agency to visually plot textural data, it also establishes an easy access portal to the data through an efficient integration with many 3rd party asset management applications.



IMS kicks off every project by completing a brief review of the agency's GIS environment to assess suitability for network referencing, survey map preparation, and pavement management purposes. Our team will consume the City's existing GIS files and use the GIS as the basis for developing the network segmentation on a logical block-to-block or intersection-to-intersection basis.

If Nevada retains an existing pavement inventory linked to an asset management system, no changes are made unless approved by City staff.

IMS collects XY coordinates for all data elements using GPS technology coupled with inertial navigation and integrates with most 3rd party GIS applications, including ESRI. At a minimum, the GIS supplied by the City should have an ownership attribute, functional classifications, contiguous line work, and be in a digital format such as shape files and/or personal/file geodatabases. As a supplemental task, IMS also offers full service "GIS Clean-Up" and "Functional Class Review" activities for agencies that require additional GIS development above and beyond standard network referencing activities.

2.4 CAMERAS & EQUIPMENT CONFIGURATION

IMS can mount up to seven HD cameras on the RST platform depending on the required views or roadside assets to be inventoried. Prior to commencing the field surveys, our team will confirm the pavement and/or right-of-way views for collection. The potential views are a forward oriented (center, left & right front), right and left sides (building fronts or sidewalks), rear/pavement view, and an adjacent right-of-way view (driver rear). As



an example of pavement image quality, the image above illustrates the center forward (camera 2) view from the Laser RST during our recent Bridgeton assignment.

Based on our understanding of this assignment, IMS proposes a minimum configuration of **at least three HD video cameras**. The camera views should be proofed out at the calibration stage, as it may be desirable to relocate or change the orientation of a camera. The center front imagery can be processed at 20-25 foot intervals, linked to the existing GIS, and provided as a personal geodatabase with image hyperlinks.



2.5 SOFTWARE ALTERNATIVE: EASY STREET ANALYSIS (ESA) SPREADSHEET

While the results of the survey will certainly be documented and bound into a final report that illustrates the findings of the survey, it is imperative that City staff have access to the pavement condition and analysis results without having to become software experts. While IMS is a leading expert with most 3rd party pavement management applications as mentioned in the previous section, we have engineered a simple, and easy to use, interactive Excel spreadsheet that utilizes the core metrics of any great pavement management system such as the ability to prioritize and optimize the multi-year plans.

The ESA spreadsheet will be programmed to develop a multi-year maintenance and rehabilitation plan using "cost of deferral" as a rehabilitation candidate selection constraint in an effort to introduce cost-benefit techniques into the City's pavement management plan. In addition, the ESA spreadsheet will have referenced deterioration curves for each functional classification, pavement type, and even pavement strength rating. The power of having the data in such an open architecture fashion allows the City to utilize 3rd party software in the future if desired. The spreadsheet will also contain a full suite of maintenance and rehabilitation techniques, unit rates, and associated PCI resets. The parameters of the analysis (Priority Weighting Factors) can also be modified and reprioritized on the fly. This will allow the City's data to evolve with the priorities of elected officials and department staff. Programmed priority weighting factors include functional classification, pavement type, and pavement strength while actual candidate selection is based on the incremental cost of deferral.

As seen in the image below, the analysis data in the spreadsheet is supplemented with many cells highlighted in yellow. The yellow highlighted cells simply indicate that they are "HOT" and can be modified by the end user. Two of the yellow cells shown below represent the Annual Budget and the Project ID. The Annual Budget cell can be modified with a new budget and the 5-year plan will automatically re-prioritize on the fly. While IMS will have already aggregated the City's segments (intersection-to-intersection) into viable projects (multiple segments strung together to form a logical project), the user has the ability to aggregate additional segments into a project or even remove a segment from a project without having to become a software expert.

The screenshot displays the 'Easy Street Analysis' spreadsheet interface. At the top, there are summary statistics for the current PCI data, including Average PCI (771,728), Standard Deviation (44,100), and a table showing the percentage of budget dedicated to surface treatments for various project types. Below this is a detailed project list with columns for Project ID, Segment, Street, Functional Class, Project Type, and various cost and analysis parameters. The interface includes several yellow-highlighted cells for user modification, such as the Annual Budget and Project ID. A sidebar on the right contains navigation and analysis options like 'Create Inventions', 'Rehab Plan By Seg', and 'Rehab Plan By Year'.

Project Year	Current PCI Data	Analysis Start Date	Analysis End Date	Analysis Period	Analysis Type	Analysis Method	Analysis Parameters	Analysis Results
2017	771,728	2017	2022	5 Years	PCI	PCI	PCI	PCI
2018	771,728	2018	2023	5 Years	PCI	PCI	PCI	PCI
2019	771,728	2019	2024	5 Years	PCI	PCI	PCI	PCI
2020	771,728	2020	2025	5 Years	PCI	PCI	PCI	PCI
2021	771,728	2021	2026	5 Years	PCI	PCI	PCI	PCI
2022	771,728	2022	2027	5 Years	PCI	PCI	PCI	PCI
Total	771,728							



ESA Functionality: Project Completion and PCI Overrides

The spreadsheet also allows an agency to re-fresh the 5-year plan by entering the maintenance and rehabilitation work completed. As seen in the image below, the spreadsheet is supplemented with "PCI Override" functionality. When work is completed on a particular segment, the user simply inserts the override PCI value along with a date. The spreadsheet then removes the segment from the 5-year plan and updates all referenced network PCI averages.

Pavement Condition Summary

Pavement Condition Summary										
Today: 3/30/2015										
PCI: 76										
Current Network PCI: 74										
Surface Distress Index (SDI)	Roughness Index (RI)	Pavement Condition Index (PCI)	PCI Survey Date	Strength Rating	Condition Rating	Load Associated Deducts (LADD)	Non-Load Associated Deducts (NLAD)	PCI Override	PCI Override Date	Current PCI
74	53	67	6/1/2014	MOD	Good	0	0			66
55	63	57	6/1/2014	MOD	Fair	27	18			55
70	63	68	6/1/2014	MOD	Good	19	10			66

Other features of the IMS Easy Street Analysis spreadsheet are as follows:

- Red triangle tips that trigger a dialogue box explaining cell contents.
- Ability to add new road segments and attributes on the fly.
- Modifiable distress indices for City field inspections.
- Input work completed and override segment level PCI scores.
- Prioritize by neighborhoods, zones, or districts.
- Ability to modify project lengths – includes aggregating and splits.
- Commit projects and force "Must Do's" or "Must Never Do".
- Program varying annual budgets over a 5-year horizon.
- Commit a percentage of the budget to surface treatments if desired.
- Automated rehab plan prioritization and optimization.
- Macros that automatically sort and filter simple rehab and inventory lists.
- Ability to sync the spreadsheet with the Data Viewer though a .CSV file export.

While the spreadsheet is not meant to replace pavement management systems, it is an alternative for agencies that do not have the resources or staff to maintain a dedicated application. If a dedicated system is still desired, IMS will assess all other available 3rd party solutions. The ESA data integrates with GIS and is also easily exportable to be tied into PAVER, RoadManager, Lucity or other software solutions.

2.6 IMS PAVEMENT ANALYSIS & MULTI-YEAR REPORT

Immediately following the completion of the field surveys, IMS will begin processing the pavement distress severity and extent scores in an effort to develop the Pavement Condition Index (PCI) for each roadway segment. The condition results are analyzed by a team of IMS engineers, who then develop the City's 5-year pavement management rehabilitation plan. This section provides a brief summary of the functionality of an IMS enhanced analysis in order to emphasize our implementation expertise as well as the abilities and constraints within a pavement analysis.

The pavement analysis operating parameters described within this section will be delivered in an easy to understand Interactive Excel spreadsheet including the segment PCI data, pavement deterioration curves, triggers (priority weight factors), and the prioritized 5-year plan. The result is an optimized 5-year plan that is open sourced and can easily be managed by Nevada staff. Select pavement management systems can also be configured using the analysis parameters described below and can be discussed as alternative options if desired by the City.

An unlimited number of pavement maintenance and rehabilitation strategies can be defined within the Easy Street Analysis (ESA) spreadsheet. An analysis is then run, incorporating the performance curves, set points, filter criteria, and rehab alternatives to identify the overall need in terms of rehab strategies and costs for the road network, for today as well as year on year for the next 5 years.

The IMS approach allows you to input any number of "what if" budget scenarios and produce prioritized yearly rehab programs based on those funding levels over a 5-year analysis period. Typical budget scenarios include Budget \$/Year, Unlimited Budget \$, "Do Nothing" Budget, and a Target PCI Budget. The City of Nevada can rest assured that the pavement analysis will not be created utilizing a "Black Box" software program that does not factor in local realities, priorities, and level of service policies.

What is included in an IMS analysis & report?

- *Present condition ranking* – detailed and summary condition data including; Good/Fair/Poor, Load Associated Distresses (LAD), Non-LAD, and Project reviews of each street in the network.
- *Fix all budget analysis* – this identifies the upper limit of spending by rehabilitating all streets assuming unlimited funding.
- *Do nothing analysis* – this identifies the effects of not performing roadway rehabilitation projects.
- *Steady state rehabilitation life cycle analysis* – this identifies the minimum amount of rehabilitation that must be completed in order to maintain the existing level of service over 3, 5, or 10 years.
- *PCI & funding levels* – what funding will be necessary to maintain a PCI of 75, 80, & 85.
- *Plus or minus 50% and other additional runs* – additional budget runs are completed at rates of +50% and -50% of the suggested steady state analysis. Up to 10 budget scenarios will be run.
- *Integration of capital projects and Master Plans* – ongoing and proposed projects that affect roadway rehabilitation planning will be incorporated into the analysis.
- *Draft 5-year rehabilitation and prioritized paving plans* – based on need, available budget and level of service constraints; a minimum of three budget runs will be completed.
- *Final prioritized paving plan* – incorporating feedback from stakeholder departments and utilities, complete with budget and level of service constraints.

2.7 QUALITY ASSURANCE THROUGHOUT THE PROJECT

The strength of the Laser RST platform is best demonstrated by its ability to collect and verify a wide array of HD digital images, GPS coordinates, and pavement distresses in a single pass. Through the integration of a Digital Condition Rating Subsystem (DCRS), the laser array, and the GPS system – the RST can collect the required data elements with one sensor, and then often check the validity of the data with another. The QA/QC review phases below summarize how each data element is collected, quantified, and verified.

At the start of the survey:

- A Project Information Form (PIF) will be created that details the survey scope and data to be collected.
- The project protocols will be documented and approved.
- The PIF will be compared against the RST set up and the data collection protocols.
- Equipment is calibrated.
- Field crew meets with the client to review the maps and overall project.

On a daily basis:

- Equipment is calibrated and daily reports completed.
- All sensors are continually monitored to ensure they are receiving data in specification.
- The RST operator also manually monitors the digital images, GPS, DDCRS, and laser data.
- Production is tracked and records of coverage are taken – each street is noted on the inventory and map, as well as through GPS and assignment of the RST Number.
- A precision verification plan and corrective action plan is also followed as necessary.
- All data is backed up and sent for processing.

At the end of the survey:

- Field crew meets with the client again to review the maps and overall project.
- Data production and coverage is reviewed to ensure all streets have been captured.
- Up to 1% of the data is field verified.

After data collection:

- The data is scrubbed and processed for anomaly reduction.
- The data is verified by the Project Engineer using in-house QA/QC tools.
- The detailed 100-foot data is aggregated into the approved segmentation for client review.
- The data will be run through a “PCI Calculator” and “Index” aggregator for client review purposes.
- The final deliverable format is populated and QA'd by the Project Principal who reviews the textural data and compare it to the high definition imagery collected in the field.
- Final format is confirmed and delivered to the City for review.

Ensuring consistent quality of pavement and asset condition data is just as important as collecting the data. Each step in the data collection process has been designed to require the data to pass a certain standard or validation before moving on to the next stage, or be returned to the source for correction.

Length Reviews: All section lengths are compared against published values to identify survey under/over runs. Streets that are too long or too short will be noted in an exceptions list and presented to the client for review.

Test of Reasonableness: In order to ensure the quality of data, IMS processes and compares RST data and HD digital image data at specified reporting intervals, by comparing individual distresses and overall condition ratings. We identify non-compatible data locations and reprocess accordingly. HD video review of select sections will also be a part of the test of reasonableness.

QA - Reports

A series of Quality Control reports are generated by both field and office personnel on a regular basis to ensure a quality product is produced. The following QA reports are produced for each project:

- Equipment Calibration Report – documents calibration results.
- Vehicle Condition Report – records vehicle, camera/sensor configuration and condition.
- Set List Report – documents data collection set points for crack widths, rut depths, tolerance, etc.
- Field Surveys Daily Activity Report – documents survey progress and any problems encountered.
- Data Processing Quality Checklist – results of QA/QC process.

QA - Field Data Collection

In addition to the QA procedures discussed herein, specific survey protocols are followed:

- Pavements are only surveyed when there is sufficient daylight and they are dry and free of debris.
- Pavements are surveyed in a single lane to provide true, consistent data. Lane changes are made only when absolutely necessary, and the location of the lane change is noted.
- Every effort is made to collect data during off peak times on heavily traveled roadways to minimize variations in speed. Sun angle is also considered during the field surveys.
- Re-inspections will be performed randomly.
- Downward facing HD digital video is captured on all roadways and is incorporated in the IMS data processing & QA/QC to validate the distress extent and severity measurements.



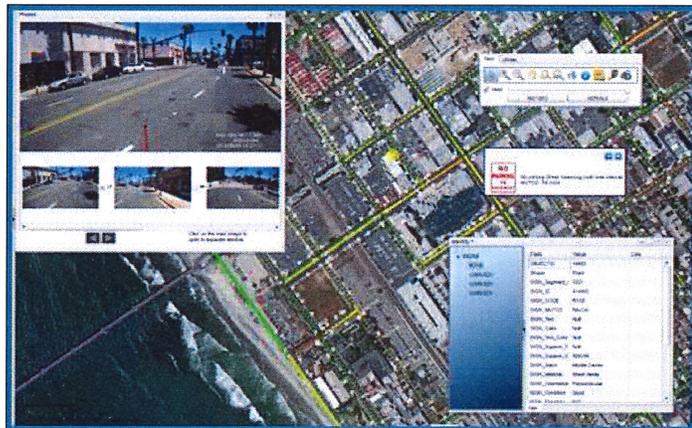
2.8 OPTIONAL CITY NEEDS ASSESSMENT & SOFTWARE EVALUATION

A primary goal of this project is not only to perform data collection, but also to implement a comprehensive Pavement Management System that meets the current and growing needs of the City of Nevada staff. IMS is well versed with the functionality of most 3rd party pavement management modules and can assist the City in the review and selection of a potential software solution. IMS also understands that not all agencies have the necessary resources to maintain dedicated pavement management software and as such, the software review process will include the review of an easy to use interactive Excel spreadsheet. Regardless of software selection, the IMS team will work directly with City Staff to implement a viable solution that meets the City needs rather than the proposing consultant.

*While IMS has established ourselves as the leading pavement management firm since 1985, we are also third party software consultants who frequently implement applications such as **PAVER, StreetSaver, Lucity, Roadsoft, Deighton, Cartegraph, VUEWorks, and many others.** We go beyond software installation and training to ensure the operating parameters of the system are setup and configured to produce reliable analysis routines and reports (select applications). While there is no “one-size-fits-all” when it comes to pavement management, IMS can ensure the selection of software that will meet current and future needs of the City’s staff and elected officials.*

To accomplish this goal, IMS Infrastructure Management Services will perform a needs assessment and full evaluation of available pavement management programs, including web demonstrations and/or on-site visits. After selection and implementation, IMS will then train the City staff on the system functionality, allowing for the development of comprehensive multi-year road rehabilitation plans that optimize pavement quality and minimize annual expenditures. IMS recently performed this very same evaluation for the cities of Pearland, Texas, Broken Arrow, Oklahoma and Tallahassee, Florida.

Software Review and Selection: IMS will review the City’s existing pavement data, its level of implementation, and user skill set. To review the benefits and disadvantages of each software module, our team will also evaluate the City’s needs and compare them against each available application. While the evaluation will include approximately seven or eight options, IMS will work with the City staff to narrow the selection to 2-3 for optional live and/or web demonstrations. Upon completion of the demos, the City staff will select an appropriate application.

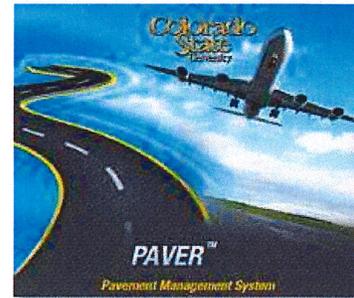


Selection should be based on three factors – the flexibility of the software (ease of use), satisfaction with the analysis tools, program and subsequent outputs (GIS, reports, budgets, etc.), and the quality of the software support and maintenance activities.

Pavement management applications come in three types: *Public Domain, Enterprise, and Engineered Systems.* We will briefly review each type on the flowing page, with an initial examination.

Public Domain: Roadsoft (PASER), PAVER, StreetSaver, Mobility, etc.

The benefits of Public Domain applications are a low cost to implement and maintain. They also offer a wide array of users across the United States. The downside is the lack of customization and configuration options. In this case, PAVER and StreetSaver are popular because of cost and industry acceptance, but lack in ability when it comes to GIS integration, optimization (cost-benefit), and flexibility of use.



Examination (\$2,000 - \$10,000): While IMS will review these applications with the City staff, we anticipate that the Public Domain applications may not meet the needs of the City. They offer very little in terms of configured prioritization and do not perform any optimization techniques.

Enterprise: Lucity, Infor, Cityworks, Cartegraph, etc.

Enterprise applications are software solutions that cater to multiple divisions within an agency (streets, sewers, parks etc.). These applications are generally well coded, integrate with GIS easily, and can be very flexible. The downside is they require some configuration to work well as the operating parameters of the system must be defined and setup. In addition, user friendliness ranges from easy to difficult to understand.



Examination (\$10,000 - \$25,000): The enterprise solutions offer the most flexibility for the configuration of tools and operating parameters. While each solution is very different, most offer the ability to customize the application to meet the needs of the City staff, including utilization of the ASTM D6433 rating methodology. The enterprise solutions typically offer well-attended user groups and customer support forums. These applications will be most likely to meet the City staff's preferred functionality, analysis tools, project development, database management, and operating parameters, as defined within the RFP.

Engineered Application: PavePRO, Deighton, RoadMatrix, etc.

These are engineered programs dedicated specifically to pavement management. They have the highest level of prioritization and optimization and present the best programs based on funding and constraints. These systems work well with complex and simple roadway networks alike. The downside is they tend to be stand-alone, meaning they do not offer software modules for all divisions within an agency. With the exception of PavePRO, they also tend to be the most costly to implement.



Examination (\$25,000 - \$100,000): The engineered systems are developed by pavement engineers for pavement engineers. While they may not cater to the complex needs of I.T. departments, they do retain the highest level of optimization and cost benefit analysis routines. Each available solution in this category is very different as Deighton is highly configurable, Road Matrix is moderately configurable, and PavePRO requires the least user input. Most of these solutions also require customized ASTM data collection protocols.

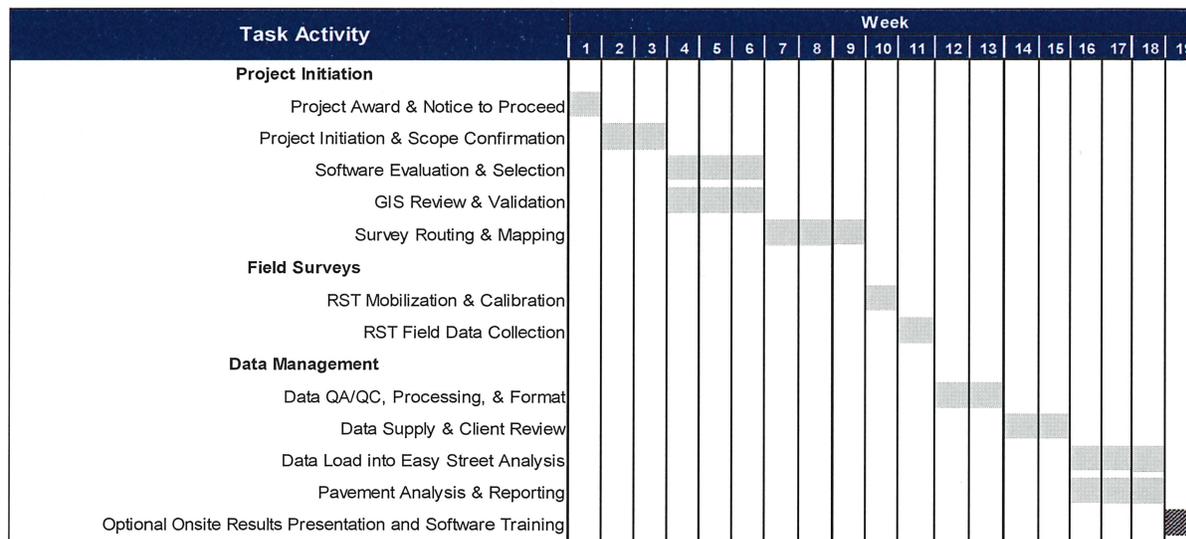


3.0 IMS CAPACITY FOR PERFORMANCE & PROJECTED COST

3.1 SCHEDULE & CAPACITY

Currently, IMS has the survey capacity for approximately 2,500 miles/month, so completing the City of Nevada surveys in a timely fashion is not an issue. Field surveys are expected to progress at a rate of 25 to 35 miles per day and are expected to proceed at 5 to 6 days per week depending on weather and statutory holidays. IMS has the available staff, equipment, and resources to manage a timely project for the City of Nevada. IMS surveys only when the roads are free of debris, freestanding water, and only with ample light conditions. IMS estimates that the RST field survey will take approximately **2-3 days** barring any weather delays.

On all projects three rate-determining functions rise to the top as being critical in maintaining the proposed project schedule. In general, it is not the surveys that take the longest time, but rather handling the data that cause project schedules to slide. The workload chart has been provided to illustrate our capacity to perform this project.





3.2 PROJECTED COST

The detailed fees presented below are based on the City's scope of services as defined in the request for proposals and the IMS work plan. The fee represents a realistic budget to complete the work and will be refined further during scope discussions with City staff. IMS will discuss with City staff the available software options, each applications capabilities & constraints, and the overall cost of implementation for each potential option.

Nevada, MO

Task	Activity	Quant	Units	Unit Rate	Total
Project Initiation					
1	Project Initiation	1	LS	\$3,000.00	\$3,000.00
2	Network Referencing & GIS Linkage	75	T-Mi	\$15.00	\$1,125.00
Field Surveys					
3	RST Mobilization/Calibration	1	LS	\$3,000.00	\$3,000.00
4	RST Field Data Collection - Pavements	75	T-Mi	\$105.00	\$7,875.00
Data Management					
5	Data QA/QC, Processing, Format, & Supply (Excel; Shapefile; KML)	75	T-Mi	\$15.00	\$1,125.00
6	Pavement Analysis, Budget Development, & Report	1	LS	\$7,500.00	\$7,500.00
	a. "ESA - Easy Street Analysis" Pavement Management Spreadsheet Software			Included in Base Activities	
	b. Customizable Prioritization & Cost-Benefit Analysis			Included in Base Activities	
	c. Log Presence of Sidewalks/Curbs & ADA Ramps (Estimates)			Included in Base Activities	
	d. Online ESA Spreadsheet Training and Support			Included in Base Activities	
7	Project Management	1	LS	\$1,365.00	\$1,365.00
Project Total:					\$24,990.00

Supplemental Activities:

8	Alternative Pavement Management Software Implementation (if desired)	1	LS	\$10,000 - \$27,500	
9	Provision of Digital Images at 20-25 foot Intervals (Per View)	75	T-Mi	\$25.00	\$1,875.00
10	Dynalect Mobilization	1	LS	\$2,500.00	\$2,500.00
	a. Deflection Testing (Major Roadways)	25	T-Mi	\$200.00	\$5,040.00
	b. Traffic Control/Deflection Testing (City to provide; IMS Est. 48 Hrs.)	0	Hr	\$125.00	\$0.00
11	Web Hosted Digital Image Viewer	1	LS	\$7,500.00	\$7,500.00
12	Council Presentation	1	LS	\$3,500.00	\$3,500.00
13	Right-of-Way Asset Data Collection (GPS & ROW Imagery)	75	T-Mi	\$25.00	\$1,875.00
	a. ADA Ramp & Obstructions Database	75	T-Mi	\$60.00	\$4,500.00
	b. Street Lights Database	75	T-Mi	\$50.00	\$3,750.00
	c. Sidewalk & Obstructions Database	75	T-Mi	\$50.00	\$3,750.00
	d. Curb & Gutter Database	75	T-Mi	\$50.00	\$3,750.00
	e. Signs & Support Database	75	T-Mi	\$100.00	\$7,500.00
	f. Pavement Markings & Stripings Database (Linear Features)	75	T-Mi	\$60.00	\$4,500.00
14	Additional Onsite Meetings	1	EA	\$3,500.00	\$3,500.00
15	Additional Hard Copies of the Final Report (>3 Sets Included)	1	EA	\$175.00	\$175.00
16	Functional Class Review	75	T-Mi	\$20.00	\$1,500.00
17	GIS Clean-Up Services	8	HR	\$175.00	\$1,400.00