Pavement Management Study
2023 Contract

The parties to the City of Dickinson Pavement Management Study 2019 Contract (Contract) are the City of Dickinson, North Dakota (City), acting through its Engineering Department, and MDS Technologies, Inc. (CONSULTANT), having its principal place of business at 350 South Northwest Highway, Suite 300, Park Ridge, Illinois, 60068.

SCOPE OF WORK

CONSULTANT, in exchange for the compensation paid by City under this Contract, shall provide the services described in the attached documents:

PROPOSAL DATED July 21, 2023

COMPENSATION

Contractual Amount

City shall pay for the accepted services provided by CONSULTANT under this Contract a lump sum amount not to exceed $44,650.00 (Contractual Amount).

The Contractual Amount is firm for the duration of this Contract and constitutes the entire compensation due CONSULTANT for performance of its obligations under this Contract regardless of the difficulty, materials or equipment required, including fees, licenses, overhead, profit and all other direct and indirect costs incurred by CONSULTANT, except as provided by an amendment to this Contract.

Payment

1) Payment made in accordance with this Compensation section shall constitute payment in full for the services and work performed and the deliverables and work(s) provided under this Contract and CONSULTANT shall not receive any additional compensation hereunder.

2) City shall make payment under this Contract within thirty (30) calendar days after receipt of a correct invoice. Progressive invoices may be submitted based on prorated percent of completion.

3) Payment of an invoice by City will not prejudice City's right to object to or question that or any other invoice or matter in relation thereto. CONSULTANT'S invoice will be subject to reduction for amounts included in any invoice or payment made which are determined by City, on the basis of audits conducted in accordance with the terms of this Contract, not to constitute allowable costs. At City's sole discretion, all payments shall be subject to reduction for amounts equal to prior overpayments to CONSULTANT.

4) For any amounts that are or will become due and payable to City by CONSULTANT, City reserves the right to deduct the amount owed from payments that are or will become due and payable to CONSULTANT under this Contract.

Travel

CONSULTANT acknowledges travel costs are covered by the Contractual Amount and shall not invoice the City of travel costs.

Prepayment

City will not make any advance payments before performance by CONSULTANT under this Contract.

Payment of Taxes by City

City is not responsible for and will not pay local, state, or federal taxes. City sales tax exemption number is E- 200 I. City will furnish certificates of exemption upon request by the CONSULTANT.

TERM OF CONTRACT

This Contract begins on the date of City approval and ends on December 31, 2023 or with the receipt of the final report and all pertinent data.

No Automatic Renewal

This Contract will not automatically renew.

Extension Option

This Contract will not have an extension option.

Renewal Option

This Contract will not have a renewal option.

TERMINATION

Termination For Convenience

This Contract may be terminated by either party upon 30 days written notice.

Termination for Lack of Funding or Authority

City by written notice to CONSULTANT, may terminate the whole or any part of this Contract under any of the following conditions:

1) If funding from federal, state, or other sources is not obtained and continued at levels sufficient to allow for purchase of the services or supplies in the indicated quantities or term.

2) If federal or state laws or rules are modified or interpreted in a way that the services are no longer allowable or appropriate for purchase under this Contract or are no longer eligible for the funding proposed for payments authorized by this Contract.

3} If any license, permit, or certificate required by law or rule, or by the terms of this Contract, is for any reason denied, revoked, suspended, or not renewed.

Termination of this Contract under this subsection is without prejudice to any obligations or liabilities of either party already accrued prior to termination.

Termination for Cause

City may terminate this Contract effective upon delivery of written notice to CONSULTANT, or any later date stated in the notice:

1) If CONSULTANT fails to provide services required by this Contract within the time specified: or

2) If CONSULTANT fails to perform any of the other provisions of this Contract, or so fails to pursue the work as to endanger performance of this Contract in accordance with its terms.

The rights and remedies of City provided in this subsection are not exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

FORCE MAJEURE

Neither party shall be held responsible for delay or default caused by fire, riot, terrorism, acts of God or war if the event is beyond the party's reasonable control and the affected party gives notice to the other party promptly upon occurrence of the event causing the delay or default or that is reasonably expected to cause a delay or default.

INDEMNITY

The CONSULTANT shall indemnify and hold harmless the City from and against claims, damages, losses and expenses arising out of or resulting from performance of the work by

CONSULTANT or anyone directly or indirectly employed by CONSULTANT, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself). This includes any claims or amounts recovered for any infringements of patent, trademark or copyright.

INSURANCE

The CONSULTANT shall procure and maintain for the duration of the Agreement insurance against claims for personal injuries or death to persons or damage to property that may arise from or in connection with the performance of the work and services hereunder by the CONSULTANT, its agents, representatives, or employees as additional insureds.

The CONSULTANT shall maintain no less than the following coverages:

General Liability Coverage: $5,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage;

Automobile Liability Coverage: $1,000,000 combined single limit per accident for bodily injury, and property damage;

Workers Compensation and Employer's Liability Coverage: Workers' Compensation limits as required by State statute and Employer's Liability limits of $1,000,000 per accident;

In the performance of its obligations pursuant to the Agreement, the CONSULTANT shall comply with all applicable provisions of federal, state and local law.

WORKS FOR HIRE

CONSULTANT acknowledges that all work(s) under this Contract is "work(s) for hire" within the meaning of the United States Copyright Act (Title 17 United States Code) and hereby assigns to City all rights and interests CONSULTANT may have in the work(s) it prepares under this Contract, including any right to derivative use of the work(s). All software and related materials developed by CONSULTANT in performance of this Contract for City shall be the sole property of City, and CONSULTANT hereby assigns and transfers all its right, title, and interest therein to City. CONSULTANT shall execute all necessary documents to enable City to protect City's intellectual property rights under this section.

WORK PRODUCT

All work product, equipment or materials created for City or purchased by City under this Contract belong to City and must be immediately delivered to City at City's request upon termination of this Contract.

CONFIDENTIALITY

CONSULTANT shall not use or disclose any information it receives from City under this Contract that City has previously identified as confidential or exempt from mandatory public disclosure except as necessary to carry out the purposes of this Contract or as authorized in advance by City. City shall not disclose any information it receives from CONSULTANT that CONSULTANT has previously identified as confidential and that City determines in its sole discretion is protected from mandatory public disclosure under a specific exception to the North Dakota public records law, N.D.C.C. ch. 44-04. The duty of City and CONSULTANT to maintain confidentiality of information under this section continues beyond the term of this Contract.

COMPLIANCE WITH PUBLIC RECORDS LAWS

CONSULTANT understands that, in accordance with this Contract's Confidentiality clause, City must disclose to the public upon request any records it receives from CONSULTANT. CONSULTANT further understands that any records obtained or generated by CONSULTANT under this Contract, except for records that are confidential under this Contract, may, under certain circumstances, be open to the public upon request under the North Dakota public records law. CONSULTANT agrees to contact City promptly upon receiving a request for information under the public records law and to comply with City's instructions on how to respond to the request.

INDEPENDENT ENTITY

CONSULTANT is an independent entity under this Contract and is not a City employee for any purpose, including the application of the Social Security Act, the Fair Labor Standards Act, the Federal Insurance Contribution Act, the North Dakota Unemployment Compensation Law and the North Dakota Workforce Safety and Insurance Act. CONSULTANT retains sole and absolute discretion in the manner and means of carrying out CONSULTANT'S activities and responsibilities under this Contract, except to the extent specified in this Contract.

ASSIGNMENT AND SUBCONTRACTS

CONSULTANT may not assign or otherwise transfer or delegate any right or duty without City's express written consent. However, CONSULTANT may enter into subcontracts provided that any subcontract acknowledges the binding nature of this Contract and incorporates this Contract, including any attachments. CONSULTANT is solely responsible for the performance of any sub-CONSULTANT with whom CONSULTANT contracts. CONSULTANT does not have authority to contract for or incur obligations on behalf of City.

SPOLIATION - PRESERVATION OF EVIDENCE

CONSULTANT shall promptly notify City of all potential claims that arise or result from this Contract. CONSULTANT shall also take all reasonable steps to preserve all physical evidence and information that may be relevant to the circumstances surrounding a potential claim. while maintaining public safety, and grants to City the opportunity to review and inspect the evidence, including the scene of an accident.

MERGER AND MODIFICATION, CONFLICT IN DOCUMENTS

This Contract, including the following documents, constitutes the entire agreement between the parties. There are no understandings, agreements, or representations, oral or written, not specified within this Contract. This Contract may not be modified, supplemented or amended, in any manner, except by written agreement signed by both parties.

Notwithstanding anything herein to the contrary, in the event of any inconsistency or conflict among the documents making up this Contract, the documents must control in this order of precedence:

a. The terms of this Contract as may be amended;

b. City's Request for Proposal ("RFP") for the 2023 Pavement Management Study Project #202318.

c. CONSULTANT's proposal dated July 21, 2023 in response to the above referenced RFP, revised to include roughness data collection, enter pavement projects/historical information, and provide PAVER User Training.

SEVERABILITY

If any term of this Contract is declared to be illegal or unenforceable by a court having competent jurisdiction, the validity of the remaining terms is unaffected and, if possible, the rights and obligations of the parties are to be construed and enforced as if this Contract did not contain that term.

APPLICABLE LAW AND VENUE

This Contract is governed by and construed in accordance with the laws of the State of North Dakota. Any action to enforce this Contract must be adjudicated exclusively in the state District Court of Stark County, North Dakota. Each party consents to the exclusive jurisdiction of such court and waives any claim of lack of jurisdiction *or forum non conveniens.*

ALTERNATIVE DISPUTE RESOLUTION-JURY TRIAL

City does not agree to any form of binding arbitration, mediation, or other forms of mandatory alternative dispute resolution. The parties have the right to enforce their rights and remedies in judicial proceedings. City does not waive any right to a jury trial.

ATTORNEY FEES

In the event a lawsuit is instituted by City to obtain performance due under this Contract, and City is the prevailing party, CONSULTANT shall pay City's reasonable attorney fees and costs in connection with the lawsuit.

NONDISCRIMINATION AND COMPLIANCE WITH LAWS

CONSULTANT agrees to comply with all laws, rules, and policies, including those relating to

nondiscrimination, accessibility and civil rights. CONSULTANT agrees to timely file all required reports, make required payroll deductions, and timely pay all taxes and premiums owed, including sales and use taxes, unemployment compensation and workers' compensation premiums. CONSULTANT shall have and keep current at all times during the term of this Contract all licenses and permits required by law.

AUDIT

All records, regardless of physical form, and the accounting practices and procedures of CONSULTANT relevant to this Contract are subject to examination by the City Auditor or designee, if required.

CONSULTANT shall maintain all of these records for at least three (3) years following completion of this Contract and be able to provide them at any reasonable time. City shall provide reasonable notice to CONSULTANT prior to conducting examination.

EFFECTIVENESS OF CONTRACT

This Contract is not effective until fully executed by both parties. If no start date is specified in the Term of Contract, the most recent date of the signatures of the parties shall be deemed the Effective Date.

CONSULTANT	**CITY OF DICKINSON**
MDS Technologies, Inc.	
By: Trevor Triffo	By:_____
Printed Name: Trevor Triffo	Printed Name:_____
Title: President	Title:_____
Date: August 8, 2023	Date:_____

MDS Technologies, Inc.

Proposal to Provide 2023 Pavement Management Study Services

Prepared for:

City of Dickinson
North Dakota

August 2, 2023

City of Dickinson
Engineering Department
99 2nd Street East
Dickinson, ND 58601

Attention: Loretta Marshik
Assistant City Engineer

Re: Proposal to Provide 2023 Pavement Management Study Services

Dear Loretta;

MDS Technologies, Inc. has a strong interest in providing the above referenced services to the City of Dickinson in response to the City of Dickinson's RFP for Project #202318. We are uniquely qualified to provide these services to the City for several reasons:

- We have successfully provided these services to the City in 2019;
- We have successfully evaluated the condition of thousands of miles of pavements in accordance with ASTM D6433 for many other municipal and county governments in 18 States and 3 Canadian provinces;
- We have expert knowledge and many years of experience implementing the PAVER pavement management system;
- We have the vehicle-based technology needed to assess the condition of the City's road network quickly, accurately, and cost-effectively;
- We have a reputation for providing high quality services delivered according to schedule for a very competitive fee.

The individual authorized to represent our firm for this project is Mr. Trevor T. Triffo, Principal. He can be reached by telephone at 847-830-1074 or by email at ttriffo@mdstechnologies.com.

Sincerely,

MDS Technologies, Inc.

Trevor T. Triffo
Principal

Table of Contents

1 Introduction

MDS Technologies, Inc. (MDST) was incorporated in 2002 in the State of Illinois as a "C" corporation. Our office is located at 350 S. Northwest Highway, Suite 300, Park Ridge, IL 60068. We currently have clients in 18 States and we serve all of them from this location. Operating from a centralized location allows us to better manage our projects and maximize the quality of our product since all the data we collect flows through the same quality control individuals and processes.

Since our inception sixteen years ago, MDST has specialized in implementing pavement management systems for the public works departments of municipal and county governments. We have performed over 150 projects that have involved implementing and updating pavement management systems with pavement condition data collected in accordance with ASTM D6433. We also inventory, map, and assess the condition of other public works assets such as traffic signs, sidewalk, curb and gutter and pavement markings.

2 Project Approach

This project involves reassessing the condition of the City's 199 centerline mile road network, updating the City's PAVER pavement management system, creating a 10 year pavement rehabilitation plan, and providing a written project report. The City may also consider GPR, FWD, and/or IRI testing on some or all of the road network.

We will assess the condition of the City's road network in accordance with the latest version of ASTM D6433. This method involves a visual assessment of the severity and extent of up to 20 distresses for both AC and PCC surfaced roads. This data will be used to calculate a Pavement Condition Index (PCI) score for each road segment. The PCI scores will be comparable to those of the 2019 study since the same evaluation method and personnel will have been used in both cases.

The consultant must also create a rehabilitation program for the upcoming ten year period. The rehabilitation program must reflect the policies and rehabilitation strategies used by the City. A written report that describes the work performed, summarizes the condition of the City's road system, and presents a rehabilitation program is to be provided.

MDST has created a Work Plan consisting of six tasks to meet the needs of the City. Each of these Tasks is discussed in detail below.

Task 1: Project Initiation Meeting

A Project Initiation meeting can be held within one week of MDST being authorized to proceed with the project by the City. This meeting will be held between MDST's Project Manager and City staff via a web meeting. This meeting will be used to review and refine the project goals, scope, schedule, establish communication protocols, and discuss the pertinent technical and

administrative details of the project. MDST's Project Manager will present our Project Approach in detail at this meeting. This will include details of our data collection technology, how pavement condition will be assessed, and our quality control processes.

We will also acquire the necessary information to prepare for field activities. The roads to be included in the project need to be identified by City staff. The main source of this information is expected to be the City's GIS pavement centerline file and the existing PAVER database. We understand that there may be a substantial number of new roads added to the City's network since we preformed the previous evaluation in 2019. We will add any new roads into the PAVER database if the City has not already done so.

Task 2: Perform Field Work

MDST will use our vehicle-based approach to collect pavement condition data on approximately 160 centerline miles of City roads. Our approach is specifically designed to be consistent with the ASTM D6433 method of pavement condition evaluation. This Task can proceed within one week after the Project Initiation Meeting has been held. This task has an expected duration of about one (1) week.

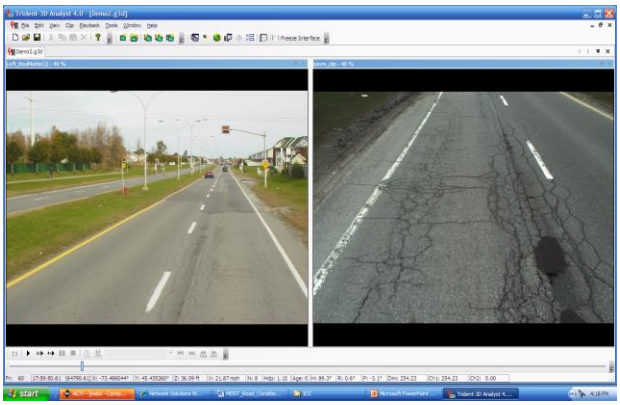
We use GPS-enabled digital cameras that output 8 MP images in JPG format. Images are typically captured at approximately 30-foot intervals to ensure complete coverage of the pavement surface. Images are usually located to within three feet of the actual location under open sky conditions. For pavement evaluation, we use a roof-mounted, two-camera configuration. One camera provides a forward -looking streetscape view, and the second camera provides a downward looking, detailed pavement view.

Our standard procedure is to test two lane roads in one (1) direction. Roads with more than two (2) lanes are tested in both directions of travel. For multi-lane roads, the lane in the worst condition is driven (typically the curb lane), but all lanes are evaluated.

At the City's option, we can also collect pavement roughness data using a cell phone app that uses the accelerometers and gyroscopes present in a modern cell phone. We have successfully collected pavement roughness data in this manner for several municipal clients. We have found the data collected with the cell phone app to be comparable to the data collected with road profiling equipment in an urban environment at significantly lower cost. A Ride Quality Index score on a zero to 100 scale can be provided to match the PCI zero to 100 scale.

Task 3: Evaluate Pavement Condition and Calculate PCI Scores

It is important to note that we assess pavement condition in an office environment. Pavement condition is assessed through analysis of the sequential digital imagery captured with the data collection vehicle. With this approach, the imagery can be viewed as slowly and as often as needed to accurately identify and capture the distresses that exist on the pavement.



A sample image pair is shown adjacent. Because each frame is tied to positioning data acquired from GPS, the location of each image pair can be easily tied to a road segment. Also, since images are captured at preset intervals, the amount of distress that occurs at each severity level can be easily tallied though procedures we have developed for this purpose.

Once acquired, the distress type, severity, and extent data are loaded into the inspection module of the PAVER system and used to calculate a PCI score for each road segment. Note that any new roads constructed since the 2019 study will be added to the system. In addition, the historical data for any roads that received rehabilitation since the 2019 study can be updated.

Task 4: Link to GIS Pavement Centerline File

The PAVER system can be linked to a GIS pavement centerline file using functionality in the PAVER system that allows a segment in the pavement management database to be linked to a corresponding segment(s) in the GIS pavement centerline file. MDST will create this linkage and configure the system so that data from the PAVER database can be exported and displayed in the City's GIS. An ESRI GIS Shape containing PCI scores and other data will be provided by MDST.

Task 5: Develop Multi-Year Rehabilitation Plan

MDST will develop a multi-year pavement rehabilitation plan that reflects the City's pavement rehabilitation policies, practices, and anticipated budget. A ten year rehabilitation plan will be created that includes tiered groupings and suggested maintenance/rehabilitation strategies prioritized for each year of the plan. Prioritization will be based on pavement condition, traffic volumes and other factors as appropriate.

Task 6: Project Report

MDST will prepare a draft and final report that summarizes the scope and objectives of the project, the data collection and evaluation methodology, key findings, and recommendations. As a minimum the report will include:

- Executive overview/summary of the project
- Field survey method and analysis
- Current PCI scores
- Multi-year rehabilitation plan for the expected budget
- Maps and Exhibits as needed to convey the results of the analysis
- Future PCI scores considering implementation of the rehabilitation program
- Other items to be determined in conjunction with the City.

Data from the PAVER system can also be provided in an Excel spreadsheet for the convenience of City staff. A backup of the updated PAVER database can also be provided.

Task 7: Pavement Roughness Data

We will collect pavement roughness data using a cell phone app called rRuf that uses the accelerometers and gyroscopes present in a modern cell phone. We have successfully collected pavement roughness data in this manner for several municipal clients. We have found the data collected with the cell phone app to be comparable to the data collected with road profiling equipment in an urban environment at significantly lower cost. A Ride Quality Index score on a zero to 100 scale can be provided to match the PCI zero to 100 scale.

The app works by measuring vertical accelerations using the accelerometer in an iPhone. The phone is placed in a rigid mount inside the vehicle so that it cannot move. The app is then initialized to determine the "zero point" for the accelerometer. When in data collection mode, the app collects vertical acceleration data and converts these readings to vertical displacements continuously as the vehicle moves along a road. The vertical displacements are summed at a user-defined interval (often 30 feet) and used to approximate International Roughness Index which is measures in vertical inches/mile. The open-ended IRI is then converted to a Riding Comfort Index on a zero to 100 scale using a logarithmic equation. The data for the 30-foot intervals that occur along a segment are combined to calculate IRI and/or RCI for each segment. The summarized data for each segment is what will be provided to the City.

The app continuously tracks vehicle position, orientation, speed and other variables. It also associates the roughness data to the appropriate segment in a GIS pavement centerline file. The app has built-in quality checks that can be used to eliminate data that does not meet thresholds for minimum speed, vehicle acceleration/deceleration, etc. The data can be transferred in real time or at the end of a data collection day to a cloud-based mapping application to view and quality check the data.

Task 8: Historical Pavement Project Data

MDST will enter the pavement projects that the City has performed over the past four years into the PAVER database. We assume the City can provide a list or map showing the location of the work, what specifically was done (e.g., chip seal, mill and overlay, etc.) and when the work was done.

Task 9 PAVER User Training

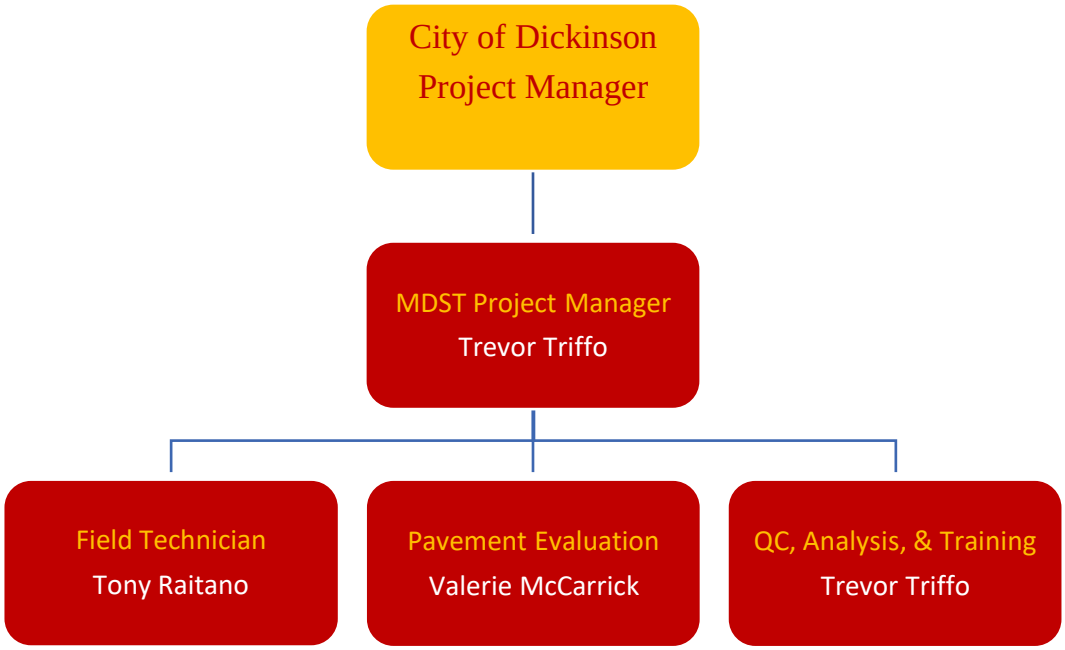
MDST will provide PAVER user training through a web meeting. Two separate two hour sessions is typically sufficient to transfer the knowledge needed to operate the system and perform typical tasks with the system. Training will include an overview of the menu system, accessing segment data, accessing inspection data, accessing historical data, generating standard and user-defined reports, using the map interface and linking to GIS, exporting data, etc. The second session can be held a few weeks after the first session and used to reinforce what was learned in the first session and possibly introduce more advanced topics such as

developing pavement performance models, creating rehabilitation programs, and performing budget analysis.

3 Project Manager and Team

MDST has assembled a team of experienced professionals for this project. MDST has the knowledge, experience, equipment, and resources to perform this project entirely with in-house staff. We do not intend to bring on any sub-consultants for this project.

Each member of MDST's project team will be assigned to a specific role. MDST's Project Manager will lead this team and personally perform quality control checks to ensure that an accurate, consistent, and complete product is created for the City. The structure of our team is shown below.



3.1 Project Manager

Mr. Trevor T. Triffo will function as MDST's **Project Manager** for this project. He is the Founder and Principal of MDST. Mr. Triffo holds a Master of Science Degree in Civil Engineering specializing in pavement and geotechnical engineering. He has worked in the pavement management field in roles of increasing responsibility over his thirty-year professional career and is a recognized leader in the industry. Mr. Triffo was Project Manager of the previous pavement management study project we performed for the City in 2019. He has also functioned as Project Manager on similar projects for many clients, including the City of Box Elder, SD; the City of South Jordan, UT; the City of Moscow, ID; the City of Green River, WY; the City of Boulder, CO; Summit County, CO; the City of South Jordan, UT; the City and County

of Honolulu, HI; the City of Fairbanks, AK; the Village of Bensenville, IL; and the Village of Bartlett, IL.

Mr. Triffo has made numerous presentations to senior staff and elected officials of municipal and county governments to provide the results of pavement management studies. He has also conducted numerous training sessions to transfer knowledge to new and experienced users of pavement management applications. A detailed resume for Mr. Triffo is provided in Appendix A. Project profiles and client contact information for projects managed by Mr. Triffo is provided in Appendix B.

3.2 Project Manager Role and Involvement

As Project Manager, Mr. Triffo will be intimately involved in all aspects of the work for the duration of the project. Any work not done specifically by Mr. Triffo will be directly overseen, reviewed for quality, and ultimately approved for release to the City by Mr. Triffo. As MDST's Project Manager of this project, Mr. Triffo will:

- function as the project team's point of contact for City staff;
- implement a Project Communication Plan to facilitate effective communication between the City and MDST. This includes bi-weekly progress reports and monthly progress reports and additional communications with the City as desired;
- manage the activities of the MDST field crew;
- oversee office-based pavement condition assessment activities;
- perform data quality checks required as part of company standard operating procedures;
- configure the pavement management system to reflect the City's policies and practices regarding rehabilitation programing and budget analysis;
- write the project report; and,
- monitor the status of the project from a cost and schedule perspective and take action as required to keep the project on track;

Mr. Triffo typically manages three or four concurrent projects. On average, about 5 to 7 hours per week is spent managing each project, including time spent on quality control. We anticipate that Mr. Triffo will be managing two or three projects when this project begins. This is a normal, manageable work load for Mr. Triffo.

3.3 Field Work Technician

Anthony Raitano will function as MDST's Field Technician for this project. Mr. Raitano has functioned in this capacity with MDST for ten years and has collected and analyzed pavement condition data for many of our clients including the City of Box Elder, SD; the City of Boulder, CO; the Town of Superior, CO; the City of South Jordan, UT; the City of Sandy Springs, GA. A detailed resume for Mr. Raitano is provided in Appendix A.

The field work is expected to take a maximum of one (1) week to complete.

3.4 Pavement/GIS Analyst

Valerie McCarrick will be assigned to this project as GIS/Pavement Analyst.
Ms. McCarrick has functioned in this capacity with MDST for six years and is an experienced member of our team. She has performed network-wide pavement evaluations using the ASTM D6433 method for the City of Boulder, CO; the Town of Superior, CO; the City of South Jordan, UT; the City of Dickinson, ND; the City of Sheridan, WY; the City of Sandy Springs, GA; Fayette County, GA; the Town of Tyrone, GA, and the Cities of Mount Prospect, Carpentersville, North Aurora, Warrenville, and Bensenville in Illinois.

On average, about 40 centerline miles of pavement can be analyzed weekly per analyst. Ms. McCarrick will devote 75% of her time to this assignment for the duration of this task. Since the project involves 199 centerline miles of roads, she will be assigned to the project for about 7 weeks.

4 Project Schedule

The project schedule is shown in the table below.

The Project Initiation Meeting (Task 1) can be performed within one week of receiving Notice to Proceed. The vehicle-based Field Work (Task 2) can proceed within one week after the Project Initiation meeting is conducted. This Task has an expected maximum duration of one week. If the project is awarded by August 15, 2023 as stated in the RFP, the fieldwork will be complete by early September. This is well before the City's requirement to complete the fieldwork by October 20, 2023.

Pavement Condition Evaluation (Task 3) will begin immediately after the field work is complete. This Task has an expected duration of approximately 7 weeks. We will confirm the existing linkage to GIS (Task 4) and make any additions and modifications to the linkage as the pavement condition evaluation work is being performed.

The Rehabilitation Plan (Task 5) can be initiated after the pavement evaluation task is complete. This task has an expected duration of two weeks. The Project Report (Task 6) can be initiated after Rehabilitation Plan has been created. This Task also has an expected duration of 2 weeks and should be complete by Week 14 of the project.

Pavement roughness data (Task 7) will be collected during Task 2 and analyzed during Task 3 beginning in Week 2 and ending in Week 10. The Pavement Projects/Historical Data (Task 8) can be input into the system during Week 3 through 10 of the project. The PAVER user training (Task 9) can begin after the Project Report is submitted. We expect that this Task will be performed in two sessions over a three week period and completed in Week 17.

<u>The entire project can be completed by December 31, 2023 if we receive authorization to proceed by August 15, 2023.</u>

5 Project Fee

MDST is prepared to perform this project for a lump sum, all-inclusive fee of $44,650. A fee schedule showing cost by task is provided below. MDST will submit an invoice to the City upon completion of the field work and on a monthly basis thereafter. Invoiced amounts will be pro-rated based on percent complete by Task. Payment terms are Net Thirty (30) days. These fees are valid for ninety (90) days.

Project Schedule and Fee Table

Task	Start Week	End Week	Fee
1. Project Initiation Meeting	1	1	$1,450
2. Perform Field Work	2	3	$9,500
3. Evaluate Pavement Condition	3	10	$17,850
4. Link to GIS Pavement Centerline File	3	10	$1,250
5. Develop Multi-Year Rehabilitation Plan	10	12	$3,950
6. Project Report	12	14	$2,950
7. Pavement Roughness Data	2	10	$5,750
8. Pavement Projects Historical Data	3	10	$950
9. PAVER Training	15	17	$1,000
Project Total:			**$44,650**

Appendix A: Resumes

Trevor T. Triffo
Principal, MDS Technologies, Inc.

Introduction

Mr. Triffo is Principal of MDST Technologies, Inc. In this position, Mr. Triffo is responsible for all aspects of company operations. Mr. Triffo has spent his thirty-year career in the pavement and transportation infrastructure asset management industry. He has participated in several hundred initial implementation and data update projects for clients at the municipal, county, regional, and state level throughout the United States and Canada. On these projects, he has functioned in a variety of positions including Project Engineer, Project Manager, and Principal in Charge. Mr. Triffo has also functioned as co-Project Manager of a comprehensive infrastructure asset management system for the State of Kuwait.

Pavement Inventory and Condition Assessment Experience

Mr. Triffo has designed, participated in, and supervised data collection programs for numerous agencies ranging from small municipalities to state DOTs. Mr. Triffo has extensive experience with a variety of data collection technologies and techniques.

- *Automated Condition Data Collection* – Mr. Triffo has been involved in over 200 projects in which non-contact technology was used to acquire pavement roughness, and wheel track rutting. A significant percentage of these projects also required collection of automated geometric information such as grade, cross-fall, and radius of curvature. This data was collected using a combination of laser cameras, accelerometers, inclinometers, and rate gyroscopes.
- *Surface Distress Surveys* – Mr. Triffo has been involved in roughly an equal number of projects that involved collection of surface distress data. Mr. Triffo is very familiar with numerous ways to collect this data including manual methods and semi-automated (windshield) methods. Mr. Triffo has also been involved in research efforts to develop a totally automated optical crack detection system that utilized high resolution digital cameras, a strobe lighting system, and a parallel process computing system to perform pixel analysis/crack detection in real time.
- *Non-Destructive Deflection Testing* – Mr. Triffo is intimately familiar with non-destructive deflection (NDT) testing of pavements. Mr. Triffo has analyzed deflection data acquired by a Dynaflect device and Falling Weight Deflectometer (FWD) on thousands of miles of pavements of all types and in all areas of the United States and Canada.

Mr. Triffo is trained as an engineer and with an emphasis in soils, materials, and pavements. His Master's research Thesis involved the study of concrete pavement deterioration due to exposure to freeze/thaw cycles. The combination of Mr. Triffo's academic training and practical experience put him in a very strong position to understand an Agency's unique pavement issues and address them in the pavement management application.

Pavement Management System Implementation Experience

The vast majority of the data collection projects mentioned above involved loading data and/or implementation of a pavement management system for client Agencies. Mr. Triffo has vast experience with all aspects of system implementation including:

- Agency needs analysis to determine the required functionality of the system;
- Design of appropriate data collection programs that meet the technical needs and budget constraints of the agency;
- Design and implementation of appropriate quality control plans to ensure data integrity;
- Development of Agency specific models so that the output of the system reflects the Agency's unique combination of conditions, policies, and practices; and
- Training of Agency staff on field data collection, principals of pavement management, and use of the selected system so that the Agency does not need to rely on outside sources to maintain the system.
- Design interfaces between the pavement management application and other systems such as GIS and Work/Maintenance Management.
- Presentation to senior staff and/or elected officials to communicate findings, conclusions, and recommendations resulting from implementation of the system.

System Design and Development

Mr. Triffo has successfully led the design and development of pavement management applications for the private and public sector. For the public sector, systems were designed to meet the specific needs of municipalities, counties, and DOT agencies.

Mr. Triffo also designed and managed the development of a comprehensive right of way asset management system. This system utilized a generalized analytical engine that enabled users to inventory and assess the condition of a wide range of infrastructure assets. The types of assets that can be accommodated by this system are signs and supports, sidewalks, curb and gutter, pavement markings, sound and retaining walls, traffic signals, lighting systems, drainage inlets and manholes, fire hydrants, underground utilities such as storm sewer, sanitary sewer, and water distribution networks.

Work History

MDS Technologies, Inc. *Founder/Principal*	Park Ridge (Chicago), IL 2002 to Present
IMS Infrastructure Management Services, Inc. *Senior Vice President*	Arlington Heights (Chicago), IL 1998 to 2002
Stantec, Inc. *Manager, Implementation Department*	Cambridge, ON, Canada 1989 to 1998
Shiplake Management, Ltd. *Construction Engineer*	Toronto, ON, Canada 1988 to 1989
Trow Geotechnical, Ltd. *Pavement Engineer*	Brampton, ON, Canada 1987 to 1988
Pavement Management Systems, Ltd. *Data Analyst*	Cambridge, ON, Canada 1986 to 1987

Education

York University 1989- 1992
Toronto, ON, Canada
Coursework toward MBA

University of Manitoba 1984 - 1987
Winnipeg, MB, Canada
M.Sc. Civil Engineering (Geotechnical/Pavements)

University of Manitoba 1980 - 1984
Winnipeg, MB, Canada
B.Sc. Civil Engineering

Anthony Raitano
Field Operations Technician and Data Analyst

Professional Experience

Mr. Raitano has functioned as a Field Operations Technician with MDST for over fifteen years.

In his role in the field, Mr. Raitano operates the MDST data collection vehicle. He performs daily calibration/quality checks and operates the vehicle in conformance with established company policies and procedures. Mr. Raitano communicates with clients to keep them informed of his whereabouts as their roads are driven, and keeps them abreast of his progress. He also contacts our clients when it appears that the map documents are inaccurate or incomplete to address the situation and ensure that all roads to be included in the field work program are tested. He has performed demonstrations of our vehicle based technology to clients.

Project Experience

Mr. Raitano has functioned as Field Operations Technician and Data Analyst on many projects, including the City of Sandy Spring, GA; the Town of Tyrone, GA; Fayette County GA; Boulder, CO; Green River, WY; York County, SC; Bartlett, IL; Glen Ellyn, IL; Carpentersville, IL; Chatham County, GA; and Carmel, IN.

Work History

MDS Technologies, Inc. — Park Ridge, IL
Field Operations Technician — 2007 to Present

City of Park Ridge — Park Ridge, IL
Police Officer — 1996 to 2004

Education

Harper College, Palatine, Illinois
Criminal Justice Major
Continuing Education 1989 - 2004

Illinois State Police Academy, Springfield, Illinois
Graduated 1995 Class 400-54

Appendix B: Sample Projects and References

MDST has been performing pavement condition assessment and implementing pavement management systems for county and municipal governments continuously since our inception in 2002. We have many clients who are very pleased with our services. The references below are from clients where the scope of work is very similar to this project.

We encourage you to contact the individuals identified below to learn about their experiences with our firm. Additional references can be provided if requested by City staff.

MDST's designated Project Manager for this project, Mr. Trevor Triffo, was also Project Manager for all the projects summarized below.

Project: Pavement Management System and Pavement Marking Inventory
Client: City of Boulder, CO
Timeframe: 2007, Annually 2009 through 2023

This ongoing work involves collecting pavement condition data to keep the City's pavement management system up to date. The City maintains approximately 365 centerline miles of roads with both AC and PCC surfaces. MDST was originally hired in 2007 to implement the system for the City. After the initial implementation, the City was divided into three geographic areas with roughly equal road mileage for purposes of keeping the data current going forward. The pavement condition data in one area (about 125 miles) has been updated annually every year since 2009 so that the data for the entire City is updated on a three-year cycle.

MDST also integrated the pavement management system with the City's GIS. Data can be passed back and forth between the two systems as desired, so the City can graphically display pavement conditional and other data from the pavement management system thematically. MDST was also retained by the City to inventory and map pavement lines and markings in GIS on all City maintained roads. This resulted in a geo-database containing approximately 10,000 records.

Contact Info: Mr. James Smith, Transportation Asset Manager
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E-mail: SmithJ@bouldercolorado.gov

Project: Pavement Management System Data Collection
Client: South Jordan City, UT
Timeframe: 2016, 2021

The City of South Jordan is located in the metropolitan Salt Lake City area. MDST was originally retained in 2016 to collect and provide pavement condition data for the City's entire 350 centerline-mile road network. We used our vehicle-based data collection technology to continuously capture sequential digital images of the County's road network. MDST staff captured the severity and extent of various pavement distresses that were present on each road segment as required by the City's pavement management system. This pavement

condition data was uploaded into the pavement management database and a numeric PCI score was calculated for each segment.

A recommended maintenance and rehabilitation program based on PCI scores and the asphalt treatments used by the City was also provided. The treatments included GSB-88, High Density Mineral Bond, Micro-surfacing, Chip Seal, and Mill 2" with 4 oz. non-woven fabric and AC overlay (PG-58-28).

MDST was re-hired in 2021 to re-evaluate the condition of the pavement network. This project also included a night-time assessment of traffic sign retro-reflectivity in accordance with FHWA recommended procedures.

Contact Info: Mr. Deven Serr, Engineer
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E-mail: dserr@sjc.utah.gov

Project: Pavement Management System Implementation
Client: City of Moscow, ID
Timeframe: 2013, 2015, 2017, 2018, 2021

The City of Moscow, ID is located in western Idaho adjacent to the Washington State line. The City maintains 83 centerline miles of both AC and PCC surfaced roads. In the original project in 2013, MDST implemented pavement management system to help staff manage the City's road network. The road network was segmented primarily on an intersection-to-intersection basis based on data acquired from the City's GIS. MDST assessed the condition of the road network and uploaded the data into the pavement management database. Pavement evaluation training was provided to City staff. Software user training was also provided.

MDST was retained in 2015 to configure the budget analysis module of the pavement management system so that City staff could use it to create multi-year rehabilitation programs and determine the effect that various pavement rehabilitation budget streams would have on the future condition of the City's road network. MDST worked in conjunction with City staff to configure the system to reflect the City's pavement rehabilitation policies and practices.

MDST was retained to re-inspect the City's roads again in 2017. The new inspection data and PCI scores were uploaded to the City's pavement management system.

The City also retained MDST in 2018 to create a traffic sign inventory from the street-level digital imagery captured as part of previous assignments. This data was provided in an ESRI geodatabase.
A pavement condition re-evaluation project was performed in 2021.

Contact Info: Mr. Steve Schulte, Streets and Stormwater Manager
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E-mail: sschulte@ci.moscow.id.us

Project: Pavement Management System Implementation
Client: City of Sandy Springs, GA
Timeframe: 2020/21

The City of Sandy Springs is located in Fulton County and shares a boundary with the City of Atlanta. It is the 7th largest City on Georgia and maintains 302 centerline miles of paved roads ranging from two lane AC surfaced roads to eight lane PCC surfaced roads.

MDST was hired in 2020 by the City to implement a pavement management system, and inventory, map, and inspect the condition of the City's traffic signs, pavement striping and markings, and guardrail. A three year improvement plan for all of these assets was created that considered the City's policies, practices, and budget constraints.

We used a vehicle-based approach to collect geo-referenced digital images of the pavement surface and overall streetscape. Images were collected at 30 ft intervals. This imagery was analyzed in the office to assess pavement condition. The resulting distress data was then loaded into the pavement management system and used to calculate a Pavement Condition Index score for each road segment.

Budget analysis was performed to assess the impact of various budget streams on the long term condition of the road network and to determine the annual budget required to maintain the network at the target level determined by City staff and elected officials. A three year improvement plan was created based on the rehabilitation strategies used at the City.

MDST inventoried and mapped the location of the City's pavement striping and markings in GIS. A Marking/Striping Type (e.g. Stop Line, Double Continuous – No Passing, Left Turn Arrow, etc.) was assigned to each Marking/Striping. The color and condition of each stripe/marking was also assessed. Each item was assigned a unique sign ID code, and all signs were assigned to a Support with unique support ID. A replacement cost was calculated for each item and a three year re-marking plan was created based on condition, road classification, and the available budget. Over 10,800 stripes and markings were mapped. The data was supplied to the City in GIS format.

The City also maintains 162 guardrails. MDST determined the type of guardrail and the end treatment type for each guardrail. We also determined the extent of any damage to a guardrail and provided an approximate cost to replace the damaged areas. A three year plan was created by prioritizing rehabilitation projects based on the extent of the damage, the functional classification of the adjacent road, and the annual budget.

MDST also inventoried and mapped the location of the City's traffic signs in GIS. An MUTCD code was assigned to each sign, and sign condition was also assessed. Each sign was assigned a unique sign ID code, and all signs were assigned to a Support with unique support ID. Over 10,500 signs were mapped. The data was supplied to the City in GIS format. A new project to re-evaluate the condition of the City's road network is planned for 2023.

Contact Info: Mitch Yeargin
Tel: 770.206.1404
E-mail: MYeargin@SandySpringsga.gov

Project: Pavement Management System Implementation
Client: Fayette County, GA
Timeframe: 2019, 2021, 2023

MDST was hired in 2019 to implement a pavement management system for the County. We used our vehicle-based technology to assess pavement condition of the County's 475 centerline mile road network. This inspection data was loaded into the County's system and used to calculate PCI scores for each road segment.

MDST was re-hired in 2021 and 2023 to re-evaluate the condition of the road network.

Contact Info: Mr. Bradley Klinger, Road Department Assistant Director
Tel: 770.320.6039
E-mail: bklinger@fayettecountyga.gov

Project: Network-Wide Pavement Evaluation
Client: Town of Tyrone, GA
Timeframe: 2021

MDST was hired in 2021 to assess the condition of the Town's 71 centerline mile road network using our vehicle-based technology. A PCI score was calculated for each road segment. PCI scores and the supporting distress data was supplied in Excel and GIS format.

Contact Info: Mr. Scott Langford, Public Works Director/Town Engineer
Tel: 770.487.4038 x109
E-mail: slangford@tyrone.org

Project: Pavement Management System Implementation, Asset Inventory and Mapping Project
Client: Village of Cary, IL
Timeframe: 2017, 2018, 2020, 2021

The Village of Cary is located in the metropolitan Chicago area. MDST was hired in 2017 to implement a pavement management system for the Village's 65 centerline-mile road network. We defined the road network as a series of segments that were typically one block long. We collected geo-referenced digital imagery using our vehicle-based technology and assessed the condition of these pavements to determine the severity and extent of various pavement distresses that were present on each road segment. This pavement condition data was uploaded into the pavement management database and a Pavement Condition Index (PCI) score was calculated for each segment. MDST installed the pavement management system on the Village's computer network and provided user training to Engineering Department staff. As

part of the 2017 project, MDST also mapped the Village's sidewalks, sidewalk ramps, curb and gutter, traffic signs, and trees in GIS.

In 2018, we were retained to perform budget analysis to assess the effect that various budget streams would have on the long-term condition of the Village's road network. We also assessed the condition of the Village's sidewalk network and provided a priority list of sidewalk segments for repair.

In 2020, MDST was retained to provide pavement management user training to Village staff. In 2021, MDST was hired to re-evaluate the condition of Cary's road network, load new inspection data into their pavement management system, and calculate new PCI scores.

Contact Info: Mr. Erik Morimoto, P.E., Village Engineer
Tel: 630.837.0811
E-mail: emorimoto@caryillinois.com

Project: Pavement and Sidewalk Management System Implementation
Client: Village of Bensenville, IL
Timeframes: 2014, 2017, 2020, 2023

Bensenville is located in metropolitan Chicago near O'Hare airport. MDST was hired to evaluate the condition or the Village's road network in 2014. MDST updated the Village's pavement management system with the new inspection data. A hard copy report was provided to the Village that presented the updated PCI scores and provided a rehabilitation strategy for each segment based on PCI score. A pavement centerline file was also provided so that the Village could view PCI scores in a GIS map.

In 2017, MDST was re-hired to update the pavement inspection data. The Village was also in the process of implementing an asset and work management system for the public works department, so MDST implemented the pavement management module of this system with Village staff. MDST transferred the pavement inventory information from the old system to the new system and made corrections and additions as needed so that the new inventory accurately represented Village's road network.

As part of the 2017 project, MDST also implemented the sidewalk management module of the Village's asset management system. The Village had a sidewalk layer in GIS that was known to be incomplete and inaccurate. MDST revised the sidewalk layer based on the street-level digital imagery we collected to assess pavement condition. We then evaluated sidewalk condition using a bicycle-based approach in which the location of damaged panels was identified using a mobile phone application. This data was used to calculate a Distress Index for each sidewalk segment. The Distress Index was uploaded to the asset management system to help prioritize rehabilitation work. A pavement condition data update project was performed in 2020 and another evaluation is being performed in 2023.

Contact Info: Mr. Joe Caracci, P.E., Director of Public Works
Tel: 630.350.3431
E-mail: jcaracci@bensenville.il.us

Project: Pavement Management System Implementation
Client: Village of Bartlett, IL
Timeframe: 2011, 2013, 2015, 2019, 2022

MDST was hired in 2011 to implement a pavement management system for the Village of Bartlett. The Village maintains approximately 130 centerline miles of roads and alleys and is in the suburban Chicago area.

MDST collected geo-referenced digital imagery using vehicle-based technology. Using a specially designed software tool, MDST staff assessed the condition of these pavements to determine the severity and extent of various pavement distresses that were present on each road segment. This pavement condition data was uploaded into the pavement management database and a Pavement Condition Index (PCI) score was calculated for each segment. MDST installed the pavement management system on the Village's computer network and provided user training to Engineering Department staff.

MDST was rehired in 2013, 2015, and 2019, and 2022 to re-evaluate the condition of the road network and update the pavement management system with the new inspection data.

Contact Info: Mr. Bob Allen, Village Engineer
Tel: 630.837.0811
E-mail: rallen@vbartlett.org

Project: Pavement Management System Implementation
Client: City of Kitchener, ON
Timeframe: 2018, 2020, 2022

The City maintains 500 centerline miles of paved roads (AC and PCC) and alleys. MDST assessed the condition of the road network using the RoadMatrix method for surface distress evaluation. IRI data was collected for both left and right wheel paths. The data was provided at 30-meter intervals in the format required by RoadMatrix for import into the system. This project was completed in approximately four months.

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