



APPLIED RESEARCH ASSOCIATES, INC.

July 31, 2017

Mr. John Ingram
Infrastructure Maintenance Director
Department of Public Works
15655 Ravinia Av
Orland Park, IL 60462
(708) 403-6350
publicworks@orlandpark.org

Subject: **Proposal for 2018 Pavement Management System Update
Village of Orland Park, Illinois**

Dear Mr. Ingram:

Applied Research Associates (ARA), Inc., appreciates the opportunity to submit this proposal for image data collection services, pavement rating, and a 2018 update of the Village of Orland Park (Orland Park) Pavement Management System using the RoadCare software. This proposal provides a description of the work effort and associated costs based on ARA's understanding of the project.

If you have any questions or need additional information, please do not hesitate to contact us.

Sincerely,

Joe Stefanski, PE (IL)
Senior Engineer

William R. Vavrik, PhD, PE (IL)
Vice-President, Principal Engineer

PROJECT UNDERSTANDING

In 2012, the Village of Orland Park hired Applied Research Associates, Inc. (ARA) to conduct a complete coverage pavement condition and right of way asset survey of all streets within the village jurisdiction. ARA performed a field survey of the agreed upon inventory of streets using ARA's digital survey vehicle (DSV). Using a combination of sensor data, GPS, and high-resolution imagery, ARA was able to gather all of the necessary data to perform a complete pavement survey as well as geo-location and attribution of a wide array of public works assets. Included in these assets were items such as road signs, curb cuts, striping, and trees within the public right of way, as well as many others. The pavement condition data was combined with historical data about the pavement network to develop a pavement management system using ARA's own RoadCare system. Pavement deterioration models were developed to project the life of roads in the future and recommendations were made to help improve the effectiveness of the village's pavement management practices. All asset data was delivered in a geo-database suitable for further implementation into the village's GIS system.

This proposal will allow for an update of images of the pavement in Orland Park, and an updated pavement condition rating using the modified Pavement Condition Index methodology to allow for further refinement of the pavement management system components. The pavement management components that will benefit from the update are the pavement performance model, treatment matrix and the monitoring of treatment choices and impacts, and development of an updated 5-year capital improvement plan (CIP). The pavement performance model will be reevaluated using data measured in 2012, and new data collected in 2018 to see if the actual pavement performance is predicted accurately using the 2012 Orland Park pavement performance model or if an adjustment should be made. The treatment matrix will be reevaluated and refined by looking at routes that received maintenance and rehabilitation strategies in previous years, and the effect of maintenance activities on the routes by comparing the ratings from 2012 and 2018.

The following project scope illustrates the tasks and milestones required to update the Orland Park pavement management system successfully.

SCOPE OF SERVICES

A task-by-task summary of ARA's proposed scope of work is provided as follows.

TASK 1. PLANNING AND DIGITAL IMAGE AND LASER-BASED DATA COLLECTION

A review of the Village's pavement management inventory, condition, GIS data, update requirements, and general discussions/coordination with Orland Park regarding M&R practices and policies for updating the data are included in this task. This preparation work will be necessary in order to collect the full inventory of Orland Park's routes in an efficient schedule.

ARA maintains and operates DSVs that are equipped with varying configurations of cameras, laser sensors, differential GPS and inertial navigation systems that can provide a wide variety of pavement surface and geometric characteristics. For this project, ARA will use advanced data collection technologies, migrating from a traditional Digital Survey Vehicle (DSV) to a Laser Crack Measurement System (LCMS) equipped DSV. Specific information that will be collected with ARA's LCMS-equipped DSV includes:

- Enhanced right-of-way images; the system used by the LCMS vehicle is a full 360° system and higher quality imagery collected every 20 feet from the right-of-way camera
- Laser surface scans of the pavement taken with the LCMS system. This data is transformed into downward images and can be used for automated crack detection.
- Longitudinal profile data collected through our standard, laser-based, profilometer.
- Transverse profile (rutting) data collected both with our standard 5 point system (for consistency) and through the LCMS.
- Faulting data collected both with our standard laser-based system (for consistency) and through the LCMS.

Automated data collection provides a number of benefits in pavement management:

- Minimal impact on traveling public with collection at highway speeds.
- Increased safety due to surface condition rating being performed in the office.
- Archived digital records and images of historical pavement and Right-of-Way (ROW) condition.
- Ability to expand utilization of images at a later time (ROW and asset inventory surveys).

For the 2018 PMS update, the actual evaluation process will remain the same but it is our objective with this new equipment to provide the following advantages to the Village of Orland Park in the future:

- Enhanced quality control of CRS values through the automated crack identification systems provided with the LCMS equipment.
- Quicker response to maintenance identification needs as specific cracking instances are automatically identified.

The DSV typically captures right-of-way images at 20-ft intervals at speeds up to 65 MPH with sub-meter positional accuracy. The full 360° imagery, and the right of way images will be provided to the Village of Orland Park in an external hard drive.

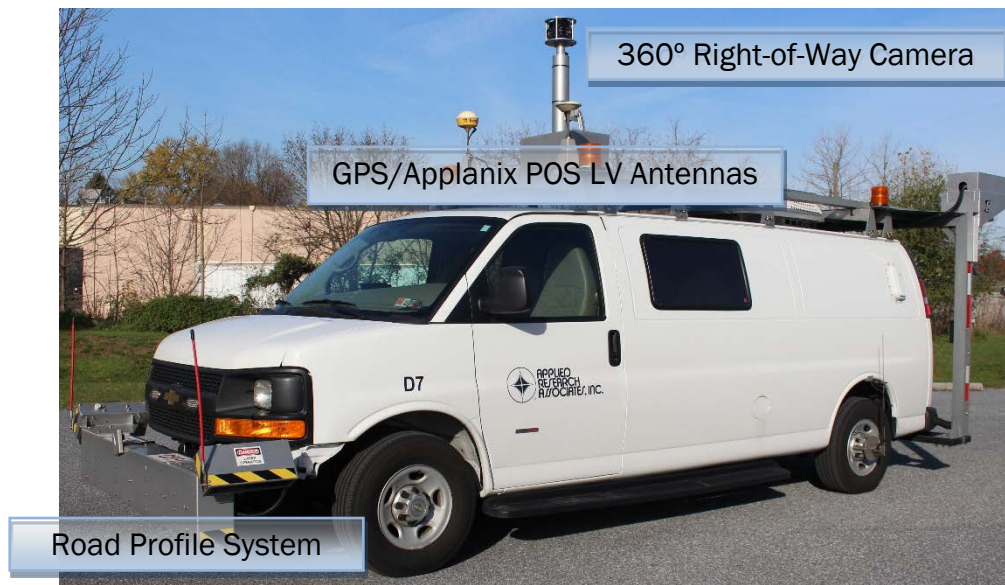


Figure 1: Digital Survey vehicle

Data is collected by driving the roadway network at highway speeds and is processed at our office workstations for organization and preparation for pavement evaluation, a process that includes quality control and quality assurance during each step of the data reduction. The full inspection cycle will include data collection for all Orland Park roadways in a single direction. The images collected as part of this survey will be the property of Orland Park and shall be delivered to the Village at the completion of the project.

TASK 2. MODIFIED PCI CONDITION SURVEY

Upon the completion of the field data collection, ARA will evaluate the pavement images and associated ROW images in our offices in Champaign, IL. In order to conduct a thorough and repeatable inspection of the Village's routes, ARA will compile all of the imagery and vehicle sensor data into a series of workstations to allow engineers and technicians to work together in a collaborative environment to perform pavement inspections from the safety of the office environment and allow for quality control measures to be implemented in real time during the survey process. ARA will perform the surface condition rating of all pavements using the modified PCI methodology in accordance with ASTM and USACOE standards. Figure 2 illustrates the methodology that each surveyor uses to identify the type, severity, and extent of key pavement distresses, such as asphalt concrete (AC) fatigue cracking, longitudinal and transverse cracking, block cracking, and pavement rutting.

Each surveyor's ratings will be reviewed by senior staff during the survey process and compared with those of other surveyors to ensure consistent and accurate evaluation. Once the PCI distresses are rated, ARA summarizes all the distresses and an overall PCI score will be calculated for each pavement management segment (scale from 100 to 0 with 100 = excellent and 0 = very poor). This allows comparing all pavements on a common scale and provides an index for monitoring pavement deterioration and treatment selection during the PMS analysis. Any GIS data developed during this task will be formatted to be compatible with ArcGIS version 10.4. A detailed table of PCI values will be provided to Orland Park as spreadsheet and GIS datasets.

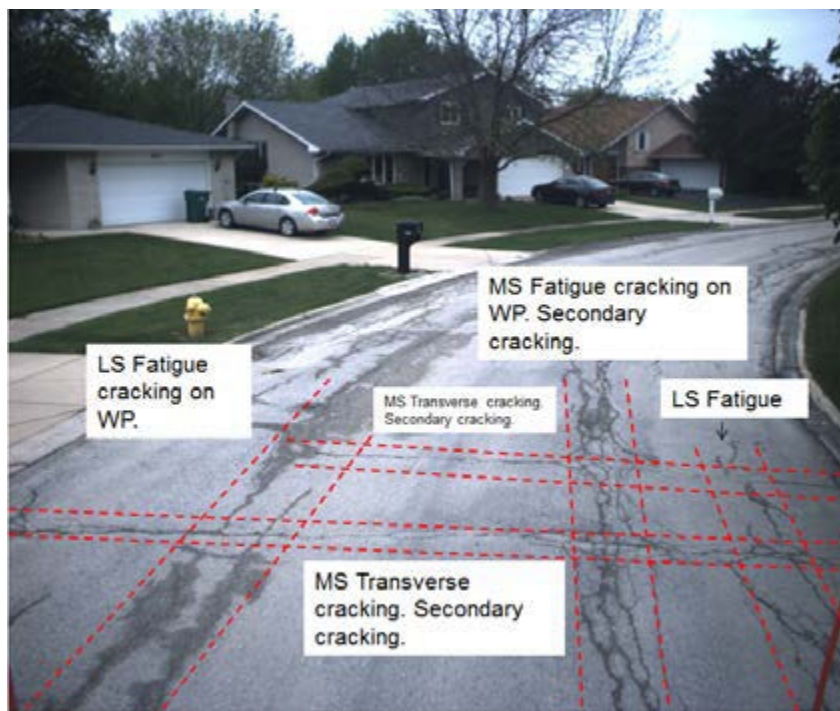


Figure 2: Illustrated PCI Sample

TASK 3. UPDATE PAVEMENT PERFORMANCE MODEL, MAINTENANCE AND REHABILITATION STRATEGIES, AND 5-YEAR CAPITAL IMPROVEMENT PLAN

ARA will review Orland Park's pavement performance model developed in 2012, and recommend any necessary revisions based on the 2018 evaluation of the updated pavement condition information and goals of Orland Park. Input from Orland Park's roads will be used to refine the deterioration curves that represent actual conditions of the network, rather than relying on generic, un-calibrated models.

ARA will update Orland Park's current maintenance and rehabilitation program, and determine if changes to the treatment matrix are necessary. This may include adjusting the timing and impact of current strategies as well as adding new repair types and strategies. Updated alligator cracking deduct values (originally measured during the 2012 PCI survey) will be considered in the treatment matrix in order to provide a structural component to the process.

Orland Park will provide updated maintenance and rehabilitation activity unit costs, as well as network goals such as a yearly budget constraint for treatment categories or desired condition levels. Other roadway priority adjustments will be considered such as target weighting, deficiency weighting, budget and condition priority weighting criteria, and maintenance and construction treatment cycle limits.

ARA will develop a 5-year projection of budget levels to reflect Orland Park's expected funding. The budgets considered should take into account all roadway work that the Village wishes to include in their pavement management system. The total budget dollars are then broken out into budget types to reflect the different sources that the Village receives funding for roadway maintenance and rehabilitation activities. ARA will use all of the details of the updated pavement management system impacts in the development of an updated Capital Improvement Program.

The benefits to Orland Park of updating the pavement management system will be the ability to perform the right treatments at the right times for optimization of the costs associated with maintaining and improving the overall network. A better understanding of future roadway conditions and budgetary needs will be realized. ARA will draft a report providing detail of the 5-year outlook on the network generated during this task.

TASK 4. MEETING AND PRESENTATION FOR ORLAND PARK STAFF, AND PUBLIC WORKS COMMITTEE

ARA will coordinate with Orland Park, as required throughout the project. ARA anticipates regular correspondence and at least one meeting to discuss the results of the 5-year CIP simulations, to make sure the end result meets the specific needs of the Village. At the end of the project, ARA will present an overview of the final report to the Village. At the request of the Village, ARA will attend and present during any Public Works Committee meetings.

PROJECT SCHEDULE

Upon receipt of a signed agreement and notice to proceed (NTP), ARA will coordinate with the Village to schedule the data collection in spring of 2018. We anticipate total project duration to be

through November 30, 2018. Deliverables will be provided within that period of time following receipt of NTP.

PROJECT PRICE

ARA's firm fixed price proposal to perform these services is \$144,900. Costs by individual tasks are shown below. These costs include labor, overhead, equipment charges, travel, and other direct costs. ARA will invoice upon completion of work for payment to be made within 30 days of receipt of invoice (NET 30).

Task Number	Task Description	Task Price
1	Kickoff and Planning/DSV Data Collection	\$68,300
2	Modified PCI Condition Survey	\$34,400
3	RoadCare M&R Customization & Analysis, Performance Model, 5 year CIP	\$32,800
4	Reports/Presentations/Meetings	\$9,400
	Total Costs	\$144,900

REQUIRED SUPPORT

ARA requires timely responses to requests for coordination/input to successfully complete this project in an efficient and effective manner. In specific, Orland Park will provide ARA with updated treatments and unit costs, M&R work performed in the past year, any thickness and traffic information as appropriate and latest budget information to assist with the effort.

We appreciate the opportunity to provide you these services and look forward to working with you on this project. If you have any questions or comments, please do not hesitate to contact us.

ACCEPTANCE OF PROPOSAL

To accept this proposal as an agreement to provide professional services in accord with the scope, price, schedule, required support, and terms & conditions, please sign this proposal in the space below. This acceptance will act as a notice to proceed.

ACCEPTANCE AND AUTHORIZATION	
Name (print)	
Title	
Signature:	
Date:	

TERMS & CONDITIONS

Applied Research Associates, Inc. (ARA) agrees to perform the specified work with the professional skill and care ordinarily provided by firms practicing in the same or similar locality under the same or similar circumstances. The parties acknowledge that there has been an opportunity to negotiate the terms and conditions of this Agreement and agree to be bound accordingly.

1. INDEPENDENT CONTRACTOR

ARA will act as an independent contractor and not as Client's agent for any purpose whatsoever, and will have no authority to make any commitments on behalf of Client or to bind Client in any way whatsoever.

2. PROJECT SUPERVISION AND ASSIGNMENT

ARA shall have wide discretion in the methods used to perform any assigned tasks unless specified otherwise. ARA will cooperate with the Client to the extent possible to arrange for consultations between the Client, ARA personnel, and others engaged in rendering services to the Client related to ARA's performance under this agreement. ARA agrees that no tasks shall be performed or expenses incurred without specific authorization of the Client.

3. OWNERSHIP OF DOCUMENTS

All data, information, software, hardware, and documents produced by ARA under this agreement shall remain the property of ARA and may not be used by the Client for any endeavor outside of the scope of this agreement without the written consent of ARA, unless otherwise noted in this agreement.

4. ACCESS TO PROJECT SITE

If required for the performance of this effort, ARA will be granted timely access to the project site as needed. If traffic control or protection is required, it shall be provided by the Client or specific provisions will be made for ARA to provide traffic control or protection at an additional price. ARA will take precautions to minimize damage when performing its work, but ARA is not responsible for any items destroyed as a necessary part of the work.

5. PAYMENT

ARA will invoice monthly and at the completion of the project, with payment due net 30 days. Interest will be charged on amounts outstanding more than 30 days. The interest rate will be 1½ percent per month, compounded until paid. In the event of late payment, the Client agrees to pay all collection costs, legal expenses and attorneys' fees incurred by ARA in collecting payment, including interest. In the event that some portion of the invoice is disputed, payment for the undisputed portion of the invoice will be made within 30 days. If the Parties are unable to reach agreement regarding the disposition of the disputed portions of the invoice within 21 days, the matter will be resolved according to the Dispute Resolution clause of this agreement.

6. HIDDEN CONDITIONS OR HAZARDOUS MATERIALS:

If ARA has reason to believe that a hidden condition may exist, ARA shall notify the client who shall authorize and pay for all costs associated with the investigation of such condition and if necessary, all costs necessary to correct such condition. If (a) the client fails to authorize such investigation of the correction after due notification, or (b) ARA has no reason to believe that such condition exists, the Client is responsible for all risks associated with this condition, and ARA shall not be responsible for the existing condition nor any resulting damages to persons or property. ARA shall have no responsibility for the discovery, presence, handling, removal, disposal or exposure of persons to hazardous materials of any form.

7. TERMINATION OF SERVICES:

This agreement may be terminated upon 10 days written notice by either party. In the event of termination, the Client shall pay ARA for all services performed to the date of termination, all reimbursable expenses and reasonable termination expenses.

8. CONFIDENTIALITY

Each party agrees not to use the other's proprietary information for any purpose other than for the performance of this Agreement. Proprietary information is defined as information concerning techniques, processes, inventions, research and development, and cost data in written form with each sheet thereof marked with an appropriate legend indicating its proprietary nature and delivered by one party to another. Any other use of such proprietary information by the recipient shall be made only upon receipt of the prior written consent from an authorized representative of the other party.



9. INDEMNIFICATION

Client (indemnitor) shall indemnify and hold harmless ARA (indemnitee) from and against any and all (including third party) claims, damages, losses and expenses (including reasonable attorney's fees) arising out of or resulting from the performance of services, provided that any such claims, damage, loss or expense is caused in whole or in part by the negligent act or omission and/or liability of the indemnitor, or anyone directly or indirectly employed by the indemnitor.

10. CONSEQUENTIAL DAMAGES

Neither Party shall be liable to the other for consequential damages, including, without limitation, loss of use or loss of profits, incurred by one another or their subsidiaries or successors, regardless of whether such damages are caused by breach of contract, willful misconduct, negligent act or omission, or other wrongful act of either of them.

11. FORCE MAJEURE

Neither party shall be liable for any failure of or delay in performance of its obligations under this Subcontract to the extent such failure or delay is due to circumstances beyond its reasonable control, including, without limitation, acts of God, acts of a public enemy, fires, floods, wars, civil disturbances, sabotage, accidents, insurrections, blockades, embargoes, storms, explosions, labor disputes, acts of any governmental body, failure or delay of third parties or governmental bodies from whom a party is obtaining or must obtain approvals, authorizations, licenses, franchises or permits, or inability to obtain labor, materials, power, equipment, or transportation (collectively referred to herein as "Force Majeure"). Each party shall use its reasonable efforts to minimize the duration and consequences of any failure of or delay in performance resulting from a Force Majeure event.

12. GOVERNING LAW

This Agreement shall be governed by and construed in accordance with the laws of the State of New Mexico, excluding its principles of conflicts of laws. The United Nations Convention for the International Sale of Goods is expressly excluded from this Agreement, and shall have no force or effect on the parties.

13. DISPUTE RESOLUTION

Any controversy or claim arising out of or relating to this agreement, or breach thereof, which may be properly submitted to arbitration, shall be settled by arbitration. The substantially prevailing party shall be entitled to recover from the non-prevailing party all costs and expenses and attorney's fees it incurred in connection with any suit or legal or administrative action or appeal with respect to this order or the transaction under it.

14. NO THIRD PARTY RIGHTS

This Agreement shall not create any rights or benefits to parties other than Client and ARA. No third party shall have the right to rely on ARA opinions rendered in connection with the Services without ARA written consent and the third party's agreement to be bound to the same conditions and limitations as Client.

16. COMPLETE AGREEMENT; MODIFICATIONS

This Agreement constitutes the entire Agreement of the parties hereto, and all previous communications between the parties, whether written or oral with reference to the subject matter of this Agreement, are hereby canceled and superseded. No modification of this Agreement shall be binding upon the parties hereto, unless such is in writing and duly signed by the respective parties hereto.