

RESOLUTION NO. R-2022-04

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BASTROP, TEXAS FOR THE PROFESSIONAL ENGINEERING SERVICES OF APPLIED PAVEMENT TECHNOLOGY FOR THE PAVEMENT CONDITION INDEX STUDY, IN THE AMOUNT OF FIFTY-FIVE THOUSAND DOLLARS AND NO/100 (\$55,000.00) FOR THE PROJECT; AND PROVIDING AN EFFECTIVE DATE, AS ATTACHED AS EXHIBIT A; AUTHORIZING THE CITY MANAGER TO EXECUTE ALL NECESSARY DOCUMENT; PROVIDING FOR A REPEALING CLAUSE; AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, The City Council of the City of Bastrop, Texas has appointed the City Manager as the Chief Administrative Officer of the City; and

WHEREAS, The City Manager is responsible for the proper administration of all affairs of the City; and

WHEREAS, The City Council of the City of Bastrop, Texas is committed to improving streets around the City; and

WHEREAS, The City of Bastrop, Texas contracted with Applied Pavement Technology in 2017 to develop a Pavement Condition Index Study; and

WHEREAS, The City Council of the City of Bastrop, Texas believes it is necessary to develop an accurate and current understanding of the maintenance of city streets.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BASTROP, TEXAS:

Section 1: That the City Manager is hereby authorized to execute an Agreement for Professional Engineering Services with Applied Pavement Technology For The Pavement Condition Index Study, In The Amount Of Fifty-Five Thousand Dollars And No/100 (\$55,000.00).

Section 2: All orders, ordinances, and resolutions, or parts thereof, which are in conflict or inconsistent with any provision of this Resolution are hereby repealed to the extent of such conflict, and the provisions of this Resolution shall be and remain controlling as to the matters resolved herein.

Section 3: That this Resolution shall take effect immediately upon its passage, and it is so resolved.

DULY RESOLVED AND ADOPTED by the City Council of the City of Bastrop this 11th day of January 2022.

APPROVED:



Connie B. Schroeder, Mayor

ATTEST:



Ann Franklin, City Secretary

APPROVED AS TO FORM:



Alan Bojorquez, City Attorney



December 1, 2021

Mr. David Juarez
Superintendent – Streets and Drainage
City of Bastrop, Texas
300 Water Street
Bastrop, Texas 78602

Re: Proposal for Pavement Condition Data Collection Services

Mr. Juarez:

Applied Pavement Technology, Inc. (APTech) is pleased to submit this proposal to the City of Bastrop to provide automated pavement condition data collection and deliver a geographic information system (GIS) database with Pavement Condition Index (PCI) values for each city road segment. APTech is a civil engineering company whose primary focus is pavement evaluation, maintenance, management, and design. Our professionals work with agencies across the country to identify innovative and effective solutions to pavement-related concerns.

Through this work we have developed extensive pavement evaluation and management experience, which we offer to you in support of the City's pavement management needs. APTech has performed similar services for many cities, including pavement condition data collection and management system updates for Northlake, Texas; Champaign, Illinois; Knoxville, Tennessee; and Bastrop, Texas (2017); among others. APTech's Enhanced Data Gathering Equipment (EDGE) automated data collection van represents the state-of-the-art, providing advanced technology for safe, efficient collection of pavement condition data.

I will serve as the Project Manager and will manage this work from APTech's Round Rock, Texas office. I have 38 years of pavement engineering and management experience and have managed pavement assessment projects of all sizes and scopes. I will serve as the primary contact for the City, will oversee all activities, and will ensure you receive the quality condition data you require to make decisions about future City work needs.

I look forward to the opportunity to work with you. If you have any questions regarding the information provided, please contact me at your convenience at mgardner@appliedpavement.com or 217-398-3977.

Sincerely,
Applied Pavement Technology, Inc.

A handwritten signature in black ink, appearing to read "Mark P. Gardner".

Mark P. Gardner, P.E.
Program Director; Local Municipalities and Private Agencies

Applied Pavement Technology, Inc.

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Urbana, Illinois 61801

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Proposal for Pavement Condition Data Collection for the City of Bastrop, Texas

Introduction

The City of Bastrop, Texas (City) is seeking a consultant to assist it with collection of condition information for its roadway network. This proposal response introduces Applied Pavement Technology, Inc. (APTech) as a qualified vendor to provide the required services.

APTech is a civil engineering consulting firm that specializes in pavements. Since its founding in 1994, APTech has worked with private and government clients to successfully complete a broad range of pavement engineering projects. We bring a winning combination of pavement- and materials-focused knowledge, diverse and meaningful related project experience, company leadership with national acclaim for their expertise, state-of-the-art technology for testing and data collection, and a commitment to quality and client focus. APTech helps clients achieve their objectives through creativity, technical excellence, and attention to quality.

The foundation of any analysis of roadway needs is quality condition data. APTech provides skilled staffing and calibrated equipment specifically focused on pavement condition data collection. Our capabilities range from detailed manual surveys to state-of-the-art, fully automated surveys using Laser Crack Measurement System (LCMS)-equipped automated data collection vans. Our staff is trained in data collection techniques specifically, including ASTM D6433 PCI surveys, and takes pride in the quality of collected data.

APTech provides engineering services from seven office locations: Urbana, Illinois (corporate headquarters); Round Rock, Texas; Shorewood, Illinois; Waunakee, Wisconsin; Reno, Nevada; Albany, New York; and Spokane, Washington. The Round Rock office will be responsible for the overall management of this project.

The following sections of this proposal provide a brief statement of professional qualifications and experience, staffing qualifications, a detailed project approach, and a proposed cost. This information will demonstrate that APTech is qualified, equipped, and staffed to perform these services for the City.

Project Experience

APTech is ideally suited to perform this pavement condition survey for the City because of our extensive capabilities and experience with automated pavement data collection, our ability to provide geo-referenced condition data, and our demonstrated experience incorporating pavement condition data in management systems so that agencies can use the data to manage their roadway assets. APTech has also developed visualization tools that clients use to better understand complex condition data. We are client-focused, working to ensure that the data supports a goal-oriented program and accountable decision making.

APTech's qualifications are exemplified by the diversity of our related project experience. Figure 1 illustrates the breadth of our pavement evaluation and management experience. APTech delivers pavement engineering excellence to clients throughout the United States.

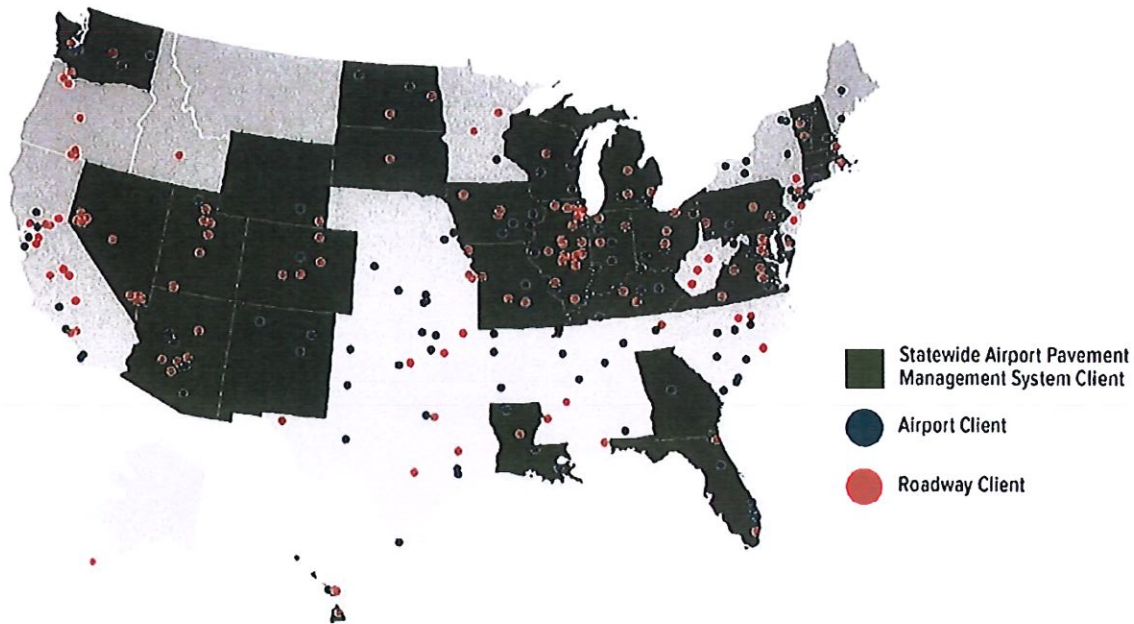


Figure 1. APTech pavement evaluation and pavement management clients.

The following are some of our recent projects that demonstrate our expertise with automated data collection and use of the resulting condition and asset data:

- **City of Northlake, Texas:** Completed automated pavement condition data collection, and assisted with the implementation of Cartegraph OMS software.
- **US Navy Installation Pavement Condition Survey:** Used an LCMS-equipped automated data collection van to collect condition information on more than 50 million square feet of roadway pavement at eight Navy installations in five states, stretching from Texas to California. The collected data was used to determine PCI, International Roughness Index (IRI), and Ride Numbers. This information was used to plan work needs and efficiently allocate funds to meet those needs.
- **Energy industry pavement damage assessments:** Used the automated data collection van to assess the condition of over 3,600 lane miles of local and county roads stretching from Illinois to Oklahoma, documenting roadway conditions (PCI, IRI, and rutting) before and after energy industry construction projects.
- **Knoxville Regional Transportation Planning Organization:** In this ongoing project, APTech is supporting condition data collection and pavement management system implementations in multiple member agencies, including the Cities of Oak Ridge, Knoxville, Clinton, and Maryville, and Blount County. This represents almost 3,000 miles of data collection, calculation of PCI values for each road segment, and implementation of two different PMS software platforms that will be used by the member agencies.

APTech has collected condition data for agencies across the US, including the Cities of Fort Wayne, Indiana (2,600 lane miles); Glenwood Springs, Colorado (105 lane miles); Cave Creek, Arizona (100 lane miles); Henderson, Nevada (177 centerline miles); and Champaign, Illinois (400 lane miles); among many others.

APTech's project experience demonstrates our substantial capabilities collecting pavement condition data using both automated and manual methods and importing that data into pavement management systems to facilitate the agency's management of roadway assets. APTech has developed tools and processes to support an efficient, smooth, and error-free transfer of data.

Staffing

Staff from APTech's Local Agencies team will complete this project. These engineers have collected thousands of miles of condition data for clients and helped them use that data to plan maintenance and rehabilitation needs and inform decision makers. The proposed Project Manager and point of contact, Mr. Mark Gardner, P.E., has 38 years of pavement data collection and management experience. Mr. Gardner will be responsible for the daily management of the project work and serve as the primary point of contact with the City of Bastrop. Mr. David Peshkin, P.E. will serve as Principal-In-Charge, maintaining attention to project quality and client commitment. Engineers Luis Sibaja and Mariela Solis will assist with data processing and quality control, and our data collection team, overseen by Will Andresen, the Data Collection Manager, will ensure that the data is collected safely, efficiently, and with the utmost attention to quality. Detailed resumes for all proposed staff are available upon request.

Project Approach

Proposed project tasks are described below.

Task 1. Project Coordination and Management

This project is scheduled to occur in 2022 after approval by the City. We propose a short kickoff meeting at the beginning of the project to review the work plan, schedule, and deliverables. This discussion will help establish a foundation for successful completion.

Other efforts under this task will include routine project coordination between the City and APTech's project manager. APTech will provide periodic status updates to the City to confirm that the project is on schedule. Dates that the equipment is in the City will be coordinated so that the City can review the EDGE van should they desire to do so.

Task 2. Network Review and Survey Planning

APTech has a GIS shapefile of the City roadway network from our previous work in 2017. It would be prudent to coordinate and update this information before proceeding to ensure that all streets within the City jurisdiction are included in the survey. Based on our initial review of the available files, we offer the following observations:

- City streets total 60 centerline miles, predominantly 2-lane, assumed all asphalt surface.
- Assuming a few multi-lane roads, and a plan including survey of 2-lane roads in one direction, and multi-lane roads in two directions, we've estimated that there will be about 80 lane-miles of automated data collection.
- There are 832 City street road segments (typical segmentation appears to be block-to-block). Of those, five segments are classified as DW and are unpaved. That leaves 827 paved city road segments for survey (All classified LS, assumed as "Local Street").
- The average length of the 827 paved city road segments is 0.072 miles, or about 370 feet. Assuming a paved width averaging 22 feet, this means the average segment paved area is 8,140 square feet.

For consistency with ASTM D6433 in determination of PCI, a sample unit is defined as having an area of 2,500 square feet (sf), +/- 1,000 sf, so the average road segment in Bastrop would contain 3 sample

units. Sampling rate for a segment having 3 sample units is 1 sample unit surveyed. This means that PCI surveys will be conducted for about 827 sample units, resulting in PCI value assignments for all road segments in the GIS database provided.

APTech will review the City GIS roadway shapefile with the City, and once complete will use that information to plan the data collection effort. This will include a review of roadway segmentation and planning for routing to make sure that data collection is complete and efficient. Data collected by our vehicle is geo-referenced, so we maintain the ability to validate location of collected data and correct segmentation as required.

Task 3. Network Survey

APTech will mobilize its EDGE automated data collection van (shown in figure 2 below) to Bastrop, Texas to survey all paved city streets. Once in the area, these surveys will take approximately 3 days to complete. APTech's data collection van is equipped with state-of-the-art LCMS technology for pavement data collection. The van collects downward facing pavement line-scan laser data providing a 3D image of the pavement surface for distress detection. The van also measures transverse profile (rutting), longitudinal profile (IRI or roughness), and collects forward and rearward facing right-of-way (ROW) images. All data for one lane is collected in a single pass at approximate roadway speeds, eliminating any need for traffic control. There is no exposure of operators to the driving public, making data collection safer for all parties. All data is geo-referenced, and a distance measurement instrument (DMI) is used to increase the location accuracy.



Figure 2. The EDGE data collection vehicle.

Task 4. Data Post Processing, Distress Surveys, and Quality Assurance

This task includes activities necessary to convert information gathered in the field into measurements and distress values, and preparation of required import tables for PAVER where PCI is calculated. To explain further, as stated previously the EDGE collects geo-referenced ROW images and line-scan laser data. The line-scan laser data is primarily used to measure distresses. To apply the laser data in that manner, they must be processed to generate images of the surface showing distresses, and then algorithms are used for

initial automated distress identification. Trained surveyors then complete workstation surveys to confirm automated results and identify distresses not discernible with automation. The results of this effort include tabulated distress data by type, severity, and extent; rutting measurements; and IRI measurements. Distress data and rutting measurements go into the calculation of PCI. Steps in this critical path process include:

- Post-processing LCMS data to produce range and intensity images, and to identify automated distresses.
- Post-processing profile data to produce longitudinal roughness (IRI) and transverse profile (rutting).
- Workstation surveys to extract distress type, severity, and extent from images.
- Quality control review – Review of distress data to confirm that segment distress data is reasonable. This review will be done using both automated and manual image reviews.

Quality control of the data collection process is essential to this project's success. APTech's quality control begins well before data collection, doesn't end until the delivery of the data, and is continuous throughout the process. Due to the importance we place on quality control, a separate section below details the efforts we take to ensure the quality of the delivered data.

Task 5. Data Delivery

Consistent with the approach in the 2017 data collection effort, APTech will provide a GIS database with PCI values assigned for each City road segment. We propose to expand the GIS information provided by the City, adding PCI value and date of measure as additional attributes. This will maintain consistency of the information that the City currently has, while also expanding the amount of information available. It's important to maintain a record of both PCI value and date when analyzing condition data.

In discussions with the City, there was not a stated requirement for a written report documenting the data collection and summarization effort; therefore, none is proposed.

Quality Control

APTech takes the quality control process very seriously and processes are put in place throughout the project tasks to ensure data quality is maintained. Some of the more important provisions are:

- All staff participate in annual training to perform their job functions. Staff will only be used if they are qualified and adequately trained to perform the services they are assigned.
- Surveyors follow documented procedures in the completion of condition surveys. In this case, ASTM D6433 will govern.
- Equipment defined for use on the project is maintained in excellent working order and is calibrated in accordance with or exceeding manufacturer's requirements.
- Prior to data collection, a series of daily checks will be performed to confirm that the equipment is operating properly (such provisions are defined in manufacturer's operating instructions and relevant specifications for data collection).
- During data collection, images and data are monitored for clarity and unusual patterns.
- A crew of two is used for data collection, allowing the driver to focus on safe driving, and the equipment operator to review the data as it is collected and monitor equipment operation.
- At the conclusion of each day's testing, data are reviewed for adequacy. The primary goal is to ensure that before leaving the site the data are suitable for post-processing and condition surveys, avoiding re-collection of data if at all possible.

- The distress data summaries will be reviewed, and any unusual distress types or quantities will be verified by visual review prior to data submittal.
- All segments with PCI values of 100 will be checked for accurate data reduction.
- All segments with missing PCI values will be checked to determine why no value was calculated.
- All project deliverables are reviewed and approved by an APTech principal before submission.

Proposed Cost

APTech's proposed costs by task to complete this effort are below. APTech will bill the City monthly as a lump sum by task based on the estimated task percentage completion at the end of each month.

Task 1 – Project Management	\$ 1,300
Task 3 – Data Collection	\$ 33,000
Task 4 – Post Processing and PCI	\$ 16,800
Task 5 – Data Delivery	\$ 3,900
Total Proposed Cost	\$ 55,000

Schedule

A schedule for this work has not been discussed with the City. It is our understanding that this will be 2022 work. APTech is prepared to perform the condition data collection and PCI determination once the weather clears. Data collection must occur when the roads are clear, dry, and free of debris. It is most likely that data collection will be scheduled for the Spring 2022.

Deliverables

The primary deliverable from this effort is a GIS database with PCI values assigned to each City roadway segment. As an added value, we will also provide the City with all images, roughness, and transverse profile data collected during field testing. A viewer was provided as part of the 2017 work that may be used to view the data, or if necessary, an updated viewer will be provided that will allow the City to view the geo-referenced data.