



Stantec Consulting Services Inc.
3133 W Frye Rd, # 300, Chandler, AZ 85226

April 12, 2021
File: 174581063.012.240

Attention: Ken Hildebrandt, PE, PTOE, City Engineer
City of Tucker
1975 Lakeside Parkway
Tucker, GA 30084

via email: KHildebrandt@Tuckerga.gov

Dear Mr. Hildebrandt,

Reference: 2021 Pavement Condition Assessment and PMS Reporting

As per our recent conversations, please find herein our proposal to complete a pavement condition assessment on the City-maintained paved roads and to generate a report summarizing the findings.

Project Overview

The primary goal of this assignment is to assess the pavement condition of the City maintained streets by means of an automated data collection vehicle, similar to the pavement condition assessment that Stantec completed in 2017. The scope of work also includes running multiple funding scenarios to determine the impact of each scenario on the current and future predicted condition of the network.

The field work would primarily consist of a pavement condition evaluation using Stantec's RT3000 automated pavement data collection technology. The pavement condition data will be collected and subsequently processed, loaded, and analyzed in Stantec's RoadMatrix pavement management system (PMS) to determine a Pavement Condition Index (PCI) for the City streets. PCI is presented on a 0-100 scale, with 0 means the worst possible condition and 100 means the best possible condition.



The RoadMatrix database that was implemented in 2017 will be amended with a limited number of new sections that were added to the City's network since 2017. Furthermore, it's our understanding that the City is planning to assess several road sections as part of a future annexation at the northwest corner of I-285 and Lavista Road.

Scope of Work

Based on a recently-provided road centerline shapefile from the City, and the existing RoadMatrix database, we estimated approximately **175.2 survey miles** that will be included in the 2021 scope of work. A map of the 2021 pavement condition assessment scope of work is provided below in Figure 1.

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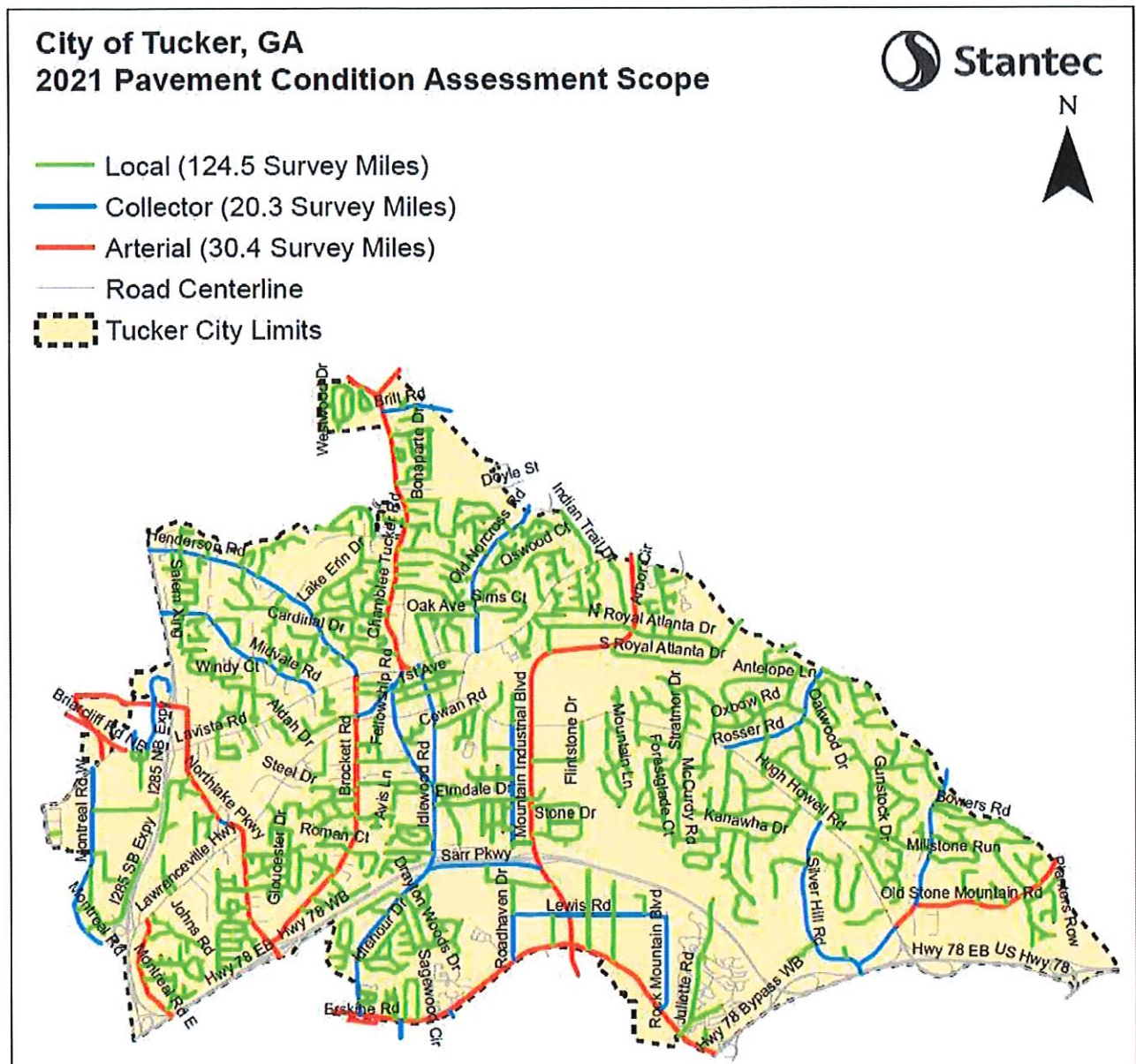


Figure 1: City of Tucker 2021 Pavement Condition Assessment Scope of Work

Proposed Work Plan

Stantec's IMPE team has been actively involved in pavement condition assessment and pavement management system implementations since 1978. With 40+ years of experience in the field, and with firsthand experience and knowledge of the City's road network based on the work we completed for the City in 2017, the City can be rest assured that an implementable strategy has been established that will ensure the City's goals from this project are met.

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Our approach for successfully implementing the scope of work presented herein is based on the tasks below. Each task is discussed in detail below.

- Task 1: Project Initiation and Management
- Task 2: Data Collection
- Task 3: Data Rating and QA/QC
- Task 4: RoadMatrix Parametric Updates
- Task 5: RoadMatrix Analysis
- Task 6: PMS Reporting

Task 1: Project Initiation and Management

Upon receiving the notice-to-proceed (NTP), Stantec will contact the City project manager to agree on a date to virtually kick off the project. The following agenda items will be discussed:

- Finalize the scope of work and condition survey approach.
- Review proposed schedule.
- Discuss the deliverables and their format.
- Discuss the desired frequency, contents and format of project updates and invoicing as part of our hands-on project management approach.

Task 2: Data Collection

ROUGHNESS AND RUTTING

The pavement roughness (longitudinal profile) and rutting (transverse profile) surveys will be completed at the same time as the surface distress survey using the RT3000 vehicle. The RT3000 incorporates an ASTM E950 **certified** Class I profiler configured to capture longitudinal profile measurements and International Roughness Index (IRI) values in both wheel paths.



The collection of longitudinal profile/roughness data is fully automated. The IRI data is collected continuously and will be summarized at 100-foot intervals. All collected data will be tagged with GPS coordinates and linear referencing measurements.

The specialized profile measurement system, mounted on the front bumper of the RT3000 survey vehicle, employs two sensing devices:

- **Laser Height Sensors** that measure the distance between the vehicle and the pavement surface, while the vehicle is traveling at posted speed or less.
- **Accelerometers** that measure the vertical acceleration of the vehicle as it bounces in response to the pavement surface profile.

The collected roughness data will be processed and summarized in 100-foot intervals, and an average **International Roughness Index (IRI)** will be computed for each roadway section, in the final deliverable table. Areas prohibiting measurement of IRI (i.e., speed < 15 mph) will be documented and provided with an override value, based on testing performed on adjacent sections of the same road. IRI results will be processed within the proposed RoadMatrix PMS to calculate the Ride Comfort Index (RCI). The RT3000 will also measure transverse profile and rut depths, using laser-based, height-measuring sensors. All rut data will

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be processed at 100-foot intervals. Average rut values, for both wheel paths, will be provided in the final deliverable table, and the values will be used in the rating criteria used for rutting in the surface distress evaluations.

SURFACE DISTRESSES

Our Road Tester 3000 (RT3000) simultaneously collects pavement condition, GPS, and digital image data streams. It collects all surface condition data, roughness, rutting, and imagery required. It uses sub-systems for the collection of roughness data, right-of-way (ROW) imagery, GPS, as well as the Laser Crack Measuring System (LCMS).

Laser Crack Measuring System (LCMS)

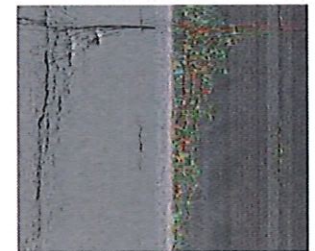
Stantec's LCMS uses laser line projectors, high speed cameras, and advanced optics, to acquire high resolution 3D profiles of the road. This unique 3D vision technology allows for automatic pavement condition assessments of asphalt, porous asphalt, chip seal, and concrete surfaces.

The LCMS acquires both 3D and 2D image data of the road surface with 1mm resolution, over a 13-foot lane width, at posted speeds up to 60 mph. This data collection technique does not impact road users as the vehicle travels at posted speeds.

The pavement imagery captured by the RT3000 is subsequently post-processed through Stantec's Imaging Workstation. This system was specifically designed for pavement surface analysis, using both the 3D and 2D pavement imagery components of the LCMS, as well as the collected ROW images. The Imaging Workstation expedites the distress rating process with built-in tools and synchronized images, from multiple cameras. The software is used to detect and analyze cracks, lane markings, ruts, macro-texture, patches, raveling, and potholes.

As a result, each distress is **measured**, not estimated, and tagged with a linear reference and corresponding GPS coordinates. The distress data is collected **continuously** and summarized at 100-foot intervals.

Some surface deficiencies and distresses (e.g., raveling) are best collected using visual assessment. Our fully trained crew will utilize a specialized keyboard to collect these other distresses when applicable. In the RT3000, Stantec employs a real-time event-recording keyboard to capture any distress/attribute information that cannot be assessed accurately by the linescan approach. Unlike other vendors, who utilize similar digital collection rating systems (DCRS) as a main component of a windshield style survey, our RT3000 technicians do not evaluate and quantify any cracking distresses while driving the streets. Rating cracking by means of a windshield approach, or non-linescan pavement view imagery, has proven to be more subjective, and can yield inconsistent results from year to year. Given our experience using various technologies, we feel the linescan downward imaging objective data process is the best method to ensure consistency and repeatability of the results.



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DISTRESS RATING PROTOCOLS

For this project, pavement distresses will be evaluated using the ASTM 6433 Standards "standard Practice for Roads and Parking Lots Pavement Condition Index (PCI) Surveys", which includes the flexible (AC) and rigid (PCC) pavement distresses in the following table.

ASTM D6433 Pavement Distresses for Flexible (AC) and Rigid (PCC) Pavements	
Flexible (AC) Pavements	Rigid (PCC) Pavements
<ul style="list-style-type: none"> • Alligator Cracking • Bleeding • Block Cracking • Bumps and Sags • Corrugation • Depression • Edge Cracking • Joint Reflection Cracking • Lane/Shoulder Drop Off • Longitudinal and Transverse Cracking • Patching and Utility Cut Patching • Polished Aggregate • Potholes • Rutting • Shoving • Slippage Cracking • Swelling • Weathering • Raveling 	<ul style="list-style-type: none"> • Blow Up/Buckling • Corner Break • Divided Slab • Durability Crack • Faulting • Joint Seal • Lane/Shoulder Drop Off • Linear Cracking • Patching (Large) • Patching (Small) • Polished Aggregate • Pop outs • Pumping • Punchouts • Scaling • Shrinkage Crack • Spalling Corner • Spalling Joint

Similar to the 2017 survey approach, roads that are divided and/or have 4 or more lanes, will be surveyed in both directions (one lane per direction). Roads that are not divided and have 3 or less lanes will only be tested in one lane and in one direction.

An exception to the rule above has been asked by the City for a number of road sections (listed in the table below) that will be a part of a future annexation at the northwest corner of I-285 and Lavista Road. These roads will be surveyed in both directions and on all lanes.

Section #	Street	From	To	Length (mi)	Lanes	Survey Miles
0000017400	BRIARCLIFF RD NE	LAVISTA RD	HENDERSON MILL RD NE	0.23	5	1.16
0000017410	BRIARCLIFF RD NE	HENDERSON MILL RD NE	HENDERSON MILL RD NE	0.08	5	0.39
0000017450	HENDERSON MILL RD NE	BRIARCLIFF RD NE	FIELDING DR NE	0.17	4	0.68
0000017460	HENDERSON MILL RD NE	FIELDING DR NE	NORTHLAKE PKWY NE	0.11	4	0.42
0000017470	NORTHLAKE PKWY NE	HENDERSON MILL RD NE	NORTHLAKE CT NE	0.28	4	1.12
0000017480	NORTHLAKE PKWY NE	NORTHLAKE CT NE	PARKLAKE DR NE	0.31	4	1.23
0000017490	NORTHLAKE PKWY NE	PARKLAKE DR NE	I-285 SB OFF RAMP	0.11	4	0.42
0000017500	NORTHLAKE PKWY NE	I-285 SB OFF RAMP	I-285 SB	0.03	4	0.13

Reference: 2021 Pavement Condition Assessment and PMS Reporting

Task 3: Data Ratings and QA/QC

Collected condition data will undergo a QA/QC procedure to ensure completeness and accuracy.

The quality-checked data will be rated according to ASTM D-6433 Distress Rating protocols as mentioned above.

QUALITY MANAGEMENT

Stantec is proud to hold three ISO certifications: Quality Management (ISO 9001:2008), Environmental Management (ISO 14001:2004), and IT Service Management (ISO 20000-1:2005) that together form our integrated management system. These certifications demonstrate that Stantec meets the accepted standards of care and diligence in how we do business relative to global standards in quality, environmental, IT, risk, and project management. Our system provides clarifications around project delivery and client service excellence.

Stantec employs a strict peer review quality assurance (QA) program that begins at project commencement and continues throughout the life cycle of a project. The QA program is designed to reduce the potential for errors while providing a systematic review of all facets of a project. This formalized project management and review system results in quality project deliverables.



Task 4: RoadMatrix Parametric Updates

The following sub-tasks will be completed as part of this year's scope of work.

- Measure section width information to calculate more accurate sections' areas.
- Update Supersections as needed to remove and/or add child sections. This subtask includes up to 10 Supersections.
- Update Treatment unit costs for use with the 2021 budget analysis.
- Upload work history for the previous 3 years (2020, 2019, 2018) to the City's RoadMatrix database (hosted on Stantec's servers) for future summaries of completed work if required.

Task 5: RoadMatrix Analysis

PRESENT STATUS ANALYSIS

Stantec will upload the pavement condition data from the 2021 survey to RoadMatrix. RoadMatrix models will be used to run present status analysis to calculate the following performance indices:

- Ride Comfort Index (RCI) – Represents the rideability.
- Pavement Condition Index (PCI) – Represents the pavement surface condition of the road.

BUDGET AND NEEDS ANALYSIS

Similar to what was completed during the 2017 cycle, the following analyses will be completed in 2021 using the 2021 pavement condition data and treatment unit costs. The analysis could be run on other budgets scenarios as needed.

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- Maintenance and Rehabilitation (M&R) needs analysis will be completed using the existing decision trees and treatment types that are in RoadMatrix but with updated unit costs.
- Budget Impact on Network PCI for the following:
 - o Do Nothing
 - o Annual Budget = \$3.0 Million
 - o Annual Budget = \$4.0 Million
 - o Annual Budget = \$5.0 Million
 - o \$1.2M Worst Singles + \$3.8M Worst Majors (Or any other combination of budgets as needed)

Task 6: PMS Reporting

Stantec will prepare and deliver a comprehensive PMS report to the City for review and approval. The report will include the following as a minimum:

- Executive Summary.
- Data Collection procedures and equipment used.
- A list of new roads found during the survey and a list of un-surveyed roads, if any, and the reasoning.
- Pavement Condition Report summarizing the present status of the City's network based on the 2021 condition survey.
- A colored GIS map depicting the present status of the network based on present PCI thresholds.
- Colored GIS maps depicting the recommended work programs
- Conclusions and Recommendations

In addition to the report, an Excel spreadsheet will be provided that includes the PCI values for each child section. This will be in addition to the results of the Supersections as defined in RoadMatrix.

Fees

The following table summarizes our proposed fees for completing the tasks included in this proposal. All pricing is exclusive of any City, State, or Federal taxes, levies, or duties. This proposal is in effect for 90 days from the date of this proposal. Invoicing will be based on a percent complete basis for the Lump Sum tasks, and per Unit Rate for quantity-based tasks.

2021 Pavement Condition Assessment and Reporting Fees

Task	Task Description	Unit Price	Task Cost
1	Project Initiation and Management	Lump Sum	\$4,000
2	Data Collection (175.2 miles)	\$135/mile	\$23,652
3	Data Rating and QA/QC	\$28/mile	\$4,905.60
4	RoadMatrix Parametric Updates	Lump Sum	\$4,750
5	RoadMatrix Analysis	Lump Sum	\$5,950
6	PMS Reporting (draft PDF + Final PDF + Excel)	Lump Sum	\$4,500
Total(Lump Sum) ¹			\$47,757.60

¹Proposal is valid for 90 days and excludes any applicable taxes

Reference: 2021 Pavement Condition Assessment and PMS Reporting

Schedule

We have prepared the following project schedule for the 2021 scope. The proposed schedule will ensure quality data is collected and a draft report is delivered to the City during the week of **October 25, 2021**. For developing the proposed schedule below, it was assumed that the NTP will be issued on or before Friday April 30, 2021.

Note that the proposed schedule below includes 2 weeks for the City to review the draft report and provide feedback before the final deliverables are sent to the City during the week of November 22, 2021. Our proposed schedule assumes favorable weather and road conditions (dry and clear from dense leaves) for 90% of the time.

Stantec's policy is that every deliverable should undergo a peer review as well as an independent review before it is submitted to the client. Therefore, the City can be rest assured that they will be receiving quality product that fulfills the project needs.

Task	Task Description	Sub Task	Proposed Milestone/Completion Date
0	Notice-To-Proceed	Assume NTP is received on or before April 30, 2021	April 30, 2021
1	Project Initiation and Management	Project Initiation/Kickoff Meeting	Week of May 10, 2021, TBD
		Project Management	Duration of the project
2	Data Collection	RT3000 Equipment and Crew Mobilization	Week of August 9, 2021
		Surface Distress and Roughness Condition Data Collection for 175.2 survey-miles	Week of August 16, 2021
3	Data Rating and QA/QC	Surface Distress and Roughness Condition Data QA/QC for 175.2 survey-miles	Week of August 16, 2021
		Surface Distress Data Rating – 175.2 miles	Week of September 20, 2021
4	RoadMatrix Parametric Updates	Section Width Measurement, Update Supersections, Update Treatment Unit Costs and Load work History	Week of October 04, 2021
5	RoadMatrix Analysis	Present Status Analysis	Week of October 18, 2021
		Needs and Budget Analysis	Week of October 18, 2021
6	PMS Reporting	Draft Report Delivery (PDF)	Week of October 25, 2021
		City Reviews Draft Report	Week of November 08, 2021
		Final Report Delivery (PDF) + Excel Summaries	Week of November 22, 2021

Note: The proposed schedule above assumes that the COVID-19 situation and associated travel restrictions, have no impact on the project execution. While this assumption may or may not be realistic at this point, Stantec will stay in close contact with the City's project team to modify the schedule as needed, to ensure that quality deliverables are delivered on time.

Reference: 2021 Pavement Condition Assessment and PMS Reporting

Terms and Conditions

Work will begin once a mutually acceptable Contract has been executed with the City.


Upon finalizing and accepting the scope of work, Stantec can either send out our standard Professional Services Agreement (PSA) to the City to review and sign, or the City can send their own Contract, Services Agreement, or Purchase Order Terms, in which case, our Risk Management team will review prior to execution. This proposal will remain valid for 90 days.

As we are all aware, we are all working in unprecedented times as a result of the COVID-19 pandemic. The situation is a very fluid one. Our proposal is based on what we understand as of today but may change as conditions change. We would be pleased to have a further discussion with you about our respective plans to manage and mitigate the impact of this evolving situation on your proposed project.

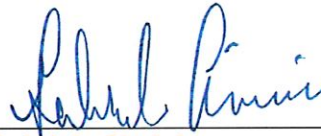
I trust that the foregoing will meet with your expectations. If you have any questions, please do not hesitate to contact me.

Regards,

Stantec Consulting Services Inc.



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