



Stantec Consulting Services Inc.
1000 Young St., Suite 470 Tonawanda NY 14150

August 13, 2021
File: 174581008.012.240

Attention: Muhammad S. Ayesh, City of Milwaukee DPW
Department of Public Works
3850 N 35th Street, Room 111
Milwaukee, WI 53216

Dear Muhammad,

Reference: 2022 Data Collection Cycle – RoadMatrix Update

With reference to your recent request for a quotation on data collection services related to your RoadMatrix pavement management application, please find attached our pricing summary for each of the proposed tasks, and related professional services contained in this document.

Project Overview

The primary goal of this assignment is to assess the pavement condition for part of the City’s maintained roads network by means of an automated data collection vehicle, similar in approach to the survey that Stantec had completed on the City roads in 2013. The pavement condition data would be collected and subsequently processed and analyzed to determine a Pavement Quality Index (PQI) for all RoadMatrix segments, within the City. The data would be formatted, as specified by the City, for upload into the City’s RoadMatrix Pavement Management System (PMS).



Scope of Work and Proposed Work Plan

Based on a preliminary review of the City’s GIS data (from April 28, 2021), a total of 1,574 survey-miles of road is expected to be surveyed in 2022. A final list of roads to be included in this project will be confirmed with City of Milwaukee project representatives, prior to commencement of the survey.

Our approach for successfully implementing the scope of work presented herein is based on the tasks discussed in detail below. The optional tasks listed below could be completed in advance of the data collection work in the Spring of 2022.

- Task 1: Project Initiation and Management
- Task 2: Project Setup and Section Verification
- Task 3: Data Collection
- Task 4: Data Rating and QA/QC
- Task 5: RoadMatrix Analysis and Reporting
- Task 6: Deterioration Model Update (Optional)
- Task 7: Decision Trees Workshop (Optional)

Reference: 2022 Data Collection Cycle – RoadMatrix Update

Task 1: Project Initiation and Management

Upon receiving the notice-to-proceed (NTP), Stantec will contact the City’s 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.

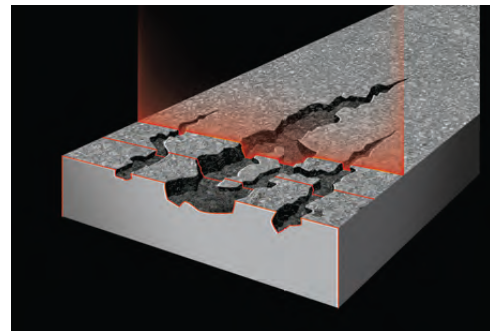
Task 2: Project Setup and Section Verification

After a detailed comparison of the City’s existing RoadMatrix database and GIS, approximately 1,780 sections were identified in the GIS which do not exist in the RoadMatrix database. There are 85 sections that exist in the new shapefile, but do not link to the previous shapefile. As a result, Stantec will need to investigate these records to ensure the GIS shapefile and RoadMatrix database are synced to ensure they are included in the field survey plan prior to starting data collection. Syncing RoadMatrix with the GIS also allows for depicting the analysis results of RoadMatrix on maps including performance, work programs, etc.

Task 3: Data Collection

The “fuel” for any pavement management engine is the pavement condition data. Pavement distress, ride quality, and structural testing can provide that important set of data for determining the costs to maintain your road network. In addition, keeping this data up-to-date, on an ongoing basis, is the only true way of measuring how well a road network is performing over time.

Stantec’s Road Tester 3000 (RT3000) incorporates the latest in mobile laser, GPS, and crack recognition technology. The RT3000 is a fully mobile solution specifically developed to accurately and efficiently collect pavement condition data. Integrated with lasers, inertial GPS, and high-definition digital imagery, the RT3000 can simultaneously collect pavement profile, rutting, surface distress, roadway geometrics, pavement and ROW imagery, and infrastructure assets.



Stantec’s typical survey protocol involves surveying all 2 lane roads in one direction, and any roads of 4 lanes or greater surveyed in both directions.

Roughness and Rutting

The RT3000 incorporates an ASTM E950 certified Class I profiler configured to capture longitudinal profile measurements and International Roughness Index (IRI) determinations in both wheel paths.

Reference: 2022 Data Collection Cycle – RoadMatrix Update

The collection of longitudinal profile/roughness data is fully automated. The IRI data is collected continuously and can be summarized at specific intervals. The IRI data is expressed in terms of a **Ride Comfort Index (RCI)**, whereby the IRI data is correlated against people's perception of ride quality on a 0 to 100 score.

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

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



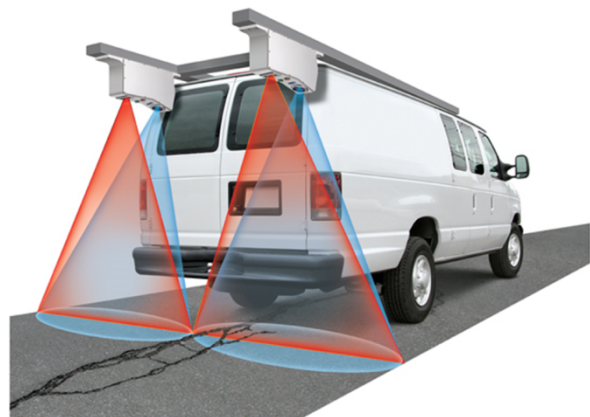
The RT3000 measures transverse profile and rut depths, using high precision, laser-based, height-measuring sensors. The lasers on either end of the rut bar are angled to provide the complete transverse profile across the traveled lane, without the need for extension pods. Extension pods can pose a hazard to other drivers, cyclists, and pedestrians.

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 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.

Laser Crack Measuring System (LCMS)

Stantec's RT3000 is purpose built to collect all physical pavement surface defects, utilizing our Laser Crack Measuring systems and downward imaging technology.

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 assessment 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 13ft lane width at survey speeds up to 60 mph.

Reference: 2022 Data Collection Cycle – RoadMatrix Update

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 RT-3000, Stantec employs a real-time event-recording keyboard to capture any distress/attribute information that cannot be assessed accurately by the linescan approach.

Distress Rating Protocols

Pavement condition is generally evaluated based on the type and amount of pavement defects or distresses. For this project, pavement distresses will be rated using a simplified version of the ASTM D6433-11 standard Practice for Roads and Parking Lots. The distresses that will be collected for each section are provided below based on the pavement type rated.

Flexible Pavements	Rigid Pavements
<ul style="list-style-type: none">• Patching• Rippling & Shoving• Raveling/Streaking• Flushing & Bleeding• Distortion• Excessive Crown• Progressive Edge Cracking• Alligator Cracking• Potholes• Block/Map Cracking• Longitudinal Cracking• Transverse Cracking• Wheel Track Rutting	<ul style="list-style-type: none">• Patching• Scaling• Raveling & Weathering• Polishing• Distortion/Frost Heave• C&D Cracking• Coarse Aggregate Loss• Potholes• Joint Sealant Loss• Linear Cracking• Transverse Cracking• Joint Spalling• Joint Faulting/Stepping

Each defect or distress is measured on the basis of two components: severity and extent. **Severity** is defined as **‘How bad is the defect?’** in terms of the width or degree of wear associated with the condition. An example of a severity measurement includes the width of a crack.

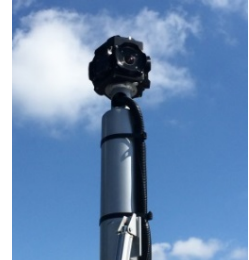
The second component evaluates the **extent** or **‘How much is there?’** in terms of the quantity of the surface the defect covers. Examples of measures used for extent would include the number or length of transverse cracks, length of longitudinal cracking, or the pavement area affected by alligator cracking.

The surface distress data will be processed and aggregated to provide a **Surface Distress Index (SDI)** for each roadway section included in the survey.

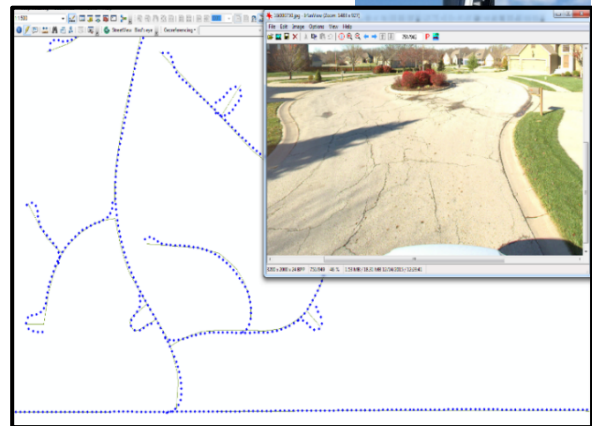
Reference: 2022 Data Collection Cycle – RoadMatrix Update

Digital Images (Optional Add-On)

High-resolution digital images will be collected during the pavement condition survey, allowing Stantec to gather additional imagery for distress rating QA/QC, as well as value added deliverables to the City. Stantec's RT3000 collects the digital imagery using Our 360° camera system will be deployed on this assignment. Our 360° camera is composed of six five-megapixel cameras mounted on a singular lever activated support, for the collection of individual or panoramic imagery. The resulting image database contains industry standard JPEGs with geo-referenced information.



Each image is tagged with a GPS coordinates and Location Referencing System (LRS) data, to facilitate easy linkage to the City's GIS and RoadMatrix PMS.



Task 4: Data Rating 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 the same RoadMatrix Distress Rating protocols that were followed as part of the 2013 survey cycle that Stantec had completed for the City.

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.



Reference: 2022 Data Collection Cycle – RoadMatrix Update

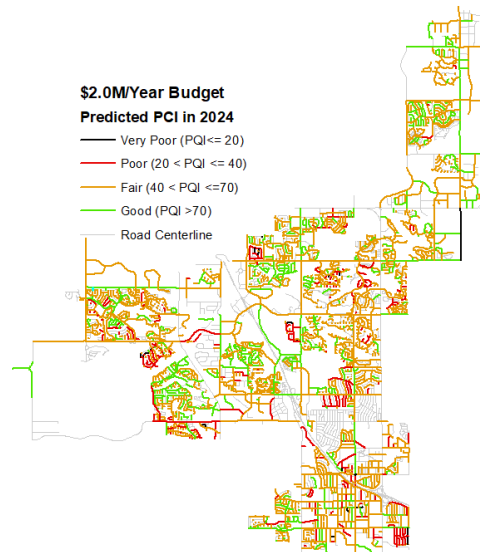
Task 5: RoadMatrix Analysis and Reporting

Present Status Analysis

Stantec will upload the pavement condition data from the 2021 survey to the City's RoadMatrix database.

RoadMatrix models will be used to run present status analysis to calculate the following performance indices for each surveyed road section:

- Surface Distress Index (SDI) – Represents the condition of the pavement surface.
- Ride Comfort Index (RCI) – Represents the ride quality.
- Pavement Quality Index (PQI) – Represents the overall condition of the road.



Recommended Work Programs

Rehabilitation analysis will be completed using rehabilitation and maintenance strategies confirmed with the City, as well as alternative budget scenarios. If the Decision Tree Workshop is selected, the recommended work will be generated using the customized decision trees which will be developed based on the scheduled workshop that will be held in-person with the City staff.

For the purposes of this proposal we have assumed that we will run up to seven (7) budget scenarios including our default Need Driven (unlimited budget) and Do Nothing (no expenditure).

Reporting

Stantec will prepare and deliver a draft PMS report to the City for review and approval before finalizing. The report will include the following:

- Executive Summary – sample attached in Appendix B.
- Data Collection procedures and equipment used.
- A list of all surveyed roads and associated performance data including SDI, RCI, and PQI.
- A list of un-surveyed roads, if any, and the reasoning (e.g., closures, gated, etc.)
- Pavement Condition Report summarizing the present status of the City's network based on the 2021 condition survey.
- A ten-year rehabilitation plan, indicating which road sections need rehabilitation and recommended treatments.
- The sectional priorities, selected strategies, and sectional costs for each programming year, based on the City's budget alternatives.
- The performance impact on the network, based on alternative funding scenarios, including 'zero funding' (or "Do Nothing") and 'unlimited funding' options.

Reference: 2022 Data Collection Cycle – RoadMatrix Update

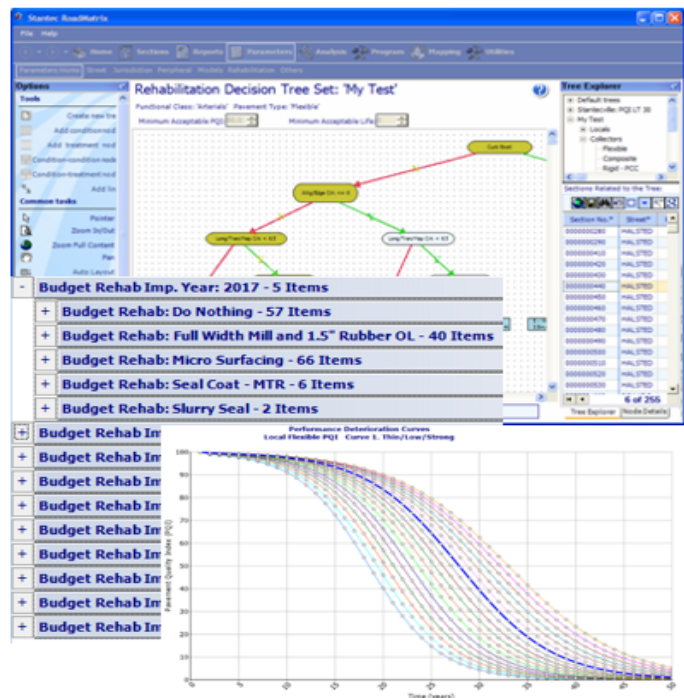
- The rehabilitation analysis will be presented to the City, in a draft format, similar to the Present Status analysis.
- GIS Maps for the current condition and recommended work programs.

Prior to submittals, the report will undergo a review from the Project Manager, and a senior member of our engineering team, to ensure quality.

Task 6: Deterioration Model Update (Optional)

It is our understanding that the City is experiencing a rather rapid deterioration of the sections' performance over time when running a short- or long-term analysis within RoadMatrix. To resolve this issue, the following items will be reviewed and updated while engaging the City into the process:

- Treatment benefits will be reviewed and updated, when/if needed.
- Deterioration curves for SDI and RCI will be reviewed and updated, when/if needed, in order to slow down the pavement deterioration over time. Worth mentioning that the curves will NOT be developed using historical performance data which could be missing or incomplete. Rather, Stantec will seek the City's input to develop curves based on the City's local knowledge of estimated range of service life for different functional classes of roads.
- The PQI will be calculated using the default models before and after the SDI and RCI curves are updated, and results will be discussed with the City to determine next steps.



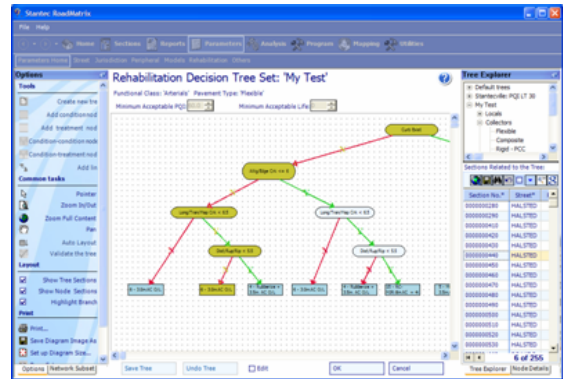
RoadMatrix offers a great flexibility for deterioration and performance calculations. The City can be assured that the steps above will provide a reasonable outcome.

Reference: 2022 Data Collection Cycle – RoadMatrix Update

Task 7: Decision Tree Workshop (Optional)

Decision Trees are used to develop maintenance and rehabilitation (M&R) work programs based on a certain decision matrix that reflects the City's current practices and sound pavement management principles, when applicable. Decision trees can be uniquely defined within RoadMatrix for each combination of functional class and pavement type. It is understood that the City's current M&R treatment list and decision trees do not reflect the City's current practices.

This task will include a full day of on-site discussion between Stantec pavement management expert, Dr. Fadi Jadoun, and City staff representatives from the Engineering, Maintenance and Operations and Capital Project departments. If an in-person meeting is not possible, Stantec can host a virtual webinar to ensure all City representatives are able to attend.



Maintenance and Rehabilitation Treatments list will be discussed and finalized. The list will include current valid treatments and treatments that the City would like to try in the future. The decision trees discussion will focus on identifying which treatment type(s) will apply to which functional class and pavement type combination of pavements, and candidate sections based on current treatment selection criteria.

Once completed, Stantec will build the trees as per the agreed upon logic/criteria and will present analysis results to the City. The City will use the analysis results (maintenance and rehab recommendations from RoadMatrix) to validate/ground-truth the recommended treatments on randomly-selected sections. Valid treatments indicate reasonable recommendations. If needed and based on ground truthing feedback received from the City, Stantec will fine-tune the trees so that they generate closer results. This proposal includes one (1) round of fine-tuning, if needed.

It is recommended that the deterioration models are reviewed prior to the Decision Tree Workshop exercise.

Reference: 2022 Data Collection Cycle – RoadMatrix Update

Fees

Our proposed fees to implement the scope of work detailed above is provided in the table below.

Fees – 2021/2022 Pavement Data Collection and RoadMatrix Update

Task No.	Task Description	Unit Cost	Subtotal
Task 1	Project Initiation and Project Management	Lump Sum	\$7,500.00
	Mobilization of Field Crew and Equipment (RT-3000)	Lump Sum	\$2,500.00
Task 2	Project Setup and Section Verification	Lump Sum	\$5,000.00
Task 3	Surface Distress and Roughness Survey. Approximately 1,574 survey-miles	\$145.00/survey-mile	\$228,230.00
Task 4	QA/QC, Analysis, and Upload to RoadMatrix	Lump Sum	\$6,500.00
Task 5	RoadMatrix budget analysis based on City needs. Up to 5 budget scenarios will be analyzed and reported.	Lump Sum	\$5,000.00
	Pavement Management Reporting – Include present status and future work programs (Draft report in PDF format and a final report in PDF format)		
Total (Lump Sum) ^{1,2}			\$254,730.00

¹ Proposed fees above are valid for 90 days from the date of this proposal.

² Project will be invoiced as a lump sum based on percentage completed.

Optional Fees – 2021/2022 Pavement Data Collection and RoadMatrix Update

Task No.	Task Description	Unit Cost	Subtotal
Task 6	OPTIONAL – Right of Way (ROW) Digital Image Collection, stamping and linkage to RoadMatrix and ESRI GIS (license sold separately)	Lump Sum	\$9,500.00
Task 7	OPTIONAL – Deterioration Model Update	Lump Sum	\$5,000.00
Task 8	OPTIONAL – Decision Trees Development Workshop – 1-day Onsite and follow-up design and draft analysis communication	Lump Sum	\$8,000.00
Total Optional (Lump Sum) ^{1,2}			\$22,500.00

¹ Proposed fees above are valid for 90 days from the date of this proposal.

² Project will be invoiced as a lump sum based on percentage completed.

Reference: 2022 Data Collection Cycle – RoadMatrix Update

Schedule

The proposed project schedule in the following table assumes all the tasks are to be completed in 2022. Some of the optional tasks can be advanced and completed in 2021. The RT-3000 is scheduled to complete the field work by end of June of 2022.

The Final RoadMatrix database would include the 2022 roads condition data and will be delivered by November 2020, assuming a prompt notice to proceed (no later than March 1, 2022, and timely feedback from the City, on any required parametric updates. The schedule assumes favorable weather conditions for 90 % of the time.

Task	Proposed Completion Date
Assumed Notice-to-Proceed (NTP)	March 1, 2022
Kick-off Meeting to discuss data availability, scope and schedule	March, Date and Time TBD
Mobilization of RT Equipment and Crew	Week of May 2, 2022
Data Collection (Surface Distresses and Roughness) on 1,574 survey-miles	Week of June 27, 2022
Field Data Editing and QA/QC	Week of July 18, 2022
Surface Distresses Condition Data Rating	Week of September 26, 2022
Pavement Condition Data Loading and Budget Analysis	Week of October 10, 2022
Draft PMS Report Submission (PDF Only)	Week of October 31, 2022
Receive Feedback from City on draft report	Week of November 7, 2022
Final PMS Report Submission (PDF + 2 hard copies)	Week of November 21, 2022
RoadMatrix database delivery Optional ROW Image delivery	Week of November 28, 2022
Optional – Deterioration Model Update	Date TBD – Can advance work in 2021
Optional – Decision Trees Workshop – One day onsite	Date TBD – Can advance work in 2021
Optional – Decision Trees Development	Date TBD – Can advance work in 2021
City Completes Ground Truthing to Validate Draft Decision Trees Results	Date TBD – Can advance work in 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: 2022 Data Collection Cycle – RoadMatrix Update

Regards,

Stantec Consulting Services Inc.



Richard Korczak M.A.Sc., P.Eng.
Managing Principal,
Infrastructure Management & Pavement
Engineering
Phone: 226-220-9760
Fax: 519-579-6733
richard.korczak@stantec.com



Fadi Jadoun Ph.D., P.E.
Associate, Pavement Specialist
Infrastructure Management & Pavement
Engineering
Phone: 480-687-6128
Fadi.jadoun@stantec.com

If City of Milwaukee agrees with this proposal, City of Milwaukee shall authorize Stantec to perform the work by signing and returning a copy of the attached Professional Services Agreement.

Attachment: Appendix A: Professional Services Agreement
Appendix B: Sample Executive Summary

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APPENDIX A

Professional Services Agreement

This Agreement is made and entered into effective August 13, 2021 (the "Agreement Date") by and between:

"Client"

Name: City of Milwaukee
Address: 3850 N 35th Street, Room 111 Milwaukee WI 53216
Phone: 414-286-2477
Representative: Muhammad S. Ayesh, Civil Engineer Email: mayesh@milwaukee.gov

"Stantec"

Name: Stantec Consulting Services Inc.
Address: 1000 Young Street, Suite 470 Tonawanda NY 14150
Phone: 226-220-9760
Representative: Richard Korczak, Managing Principal Email: richard.korczak@stantec.com

Project Name (the "Project"):

City of Milwaukee - 2022 Data Collection Cycle and RoadMatrix Update

DESCRIPTION OF WORK: Stantec shall render the services described in Attachment "A" (hereinafter called the "Services") in accordance with this Agreement. Stantec may, at its discretion and at any stage, engage subconsultants to perform all or any part of the Services. The Client and Stantec by written amendment to this Agreement may from time to time make changes to the Services. All changed work shall be carried out under this Agreement. The time for completion of the Services shall be adjusted accordingly.

DESCRIPTION OF CLIENT: The Client confirms and agrees that the Client has authority to enter into this Agreement on its own behalf and on behalf of all parties related to the Client who may have an interest in the Project.

COMPENSATION: Charges for the Services rendered will be made in accordance with the Contract Price indicated in Attachment "A", or, if no Contract Price is indicated, in accordance with Stantec's Schedule of Fees and Disbursements in effect from time to time as the Services are rendered.

Invoices shall be paid by the Client in the currency of the jurisdiction in which the Services are provided without deduction or setoff upon receipt. Failure to make any payment when due is a material breach of this Agreement and will entitle Stantec, at its option, to suspend or terminate this Agreement and the provision of the Services. Interest will accrue on accounts overdue by 30 days at the lesser of 1.5 percent per month (18 percent per annum) or the maximum legal rate of interest.

REPRESENTATIVES: Each party shall designate in the space provided above a representative who is authorized to act on behalf of that party and receive notices under this Agreement. Such representatives have complete authority to act on behalf of their principals in respect to all matters arising under this Agreement.

NOTICES: All notices, consents, and approvals required to be given hereunder shall be in writing and shall be given to the representatives of each party. All notices required by this Agreement to be given by either party shall be deemed to be properly given and received within two (2) business days if made in writing to the other party by certified mail or email, addressed to the regular business address of such party as identified above.

CLIENT'S RESPONSIBILITIES: The Client shall provide to Stantec in writing, the Client's total requirements in connection with the Project, including the Project budget and time constraints. The Client shall make available to Stantec all relevant information or data pertinent to the Project which is required by Stantec to perform the Services. Stantec shall be entitled to rely upon the accuracy and completeness of all information and data furnished by the Client, including information and data originating with other consultants employed by the Client whether such consultants are engaged at the request of Stantec or otherwise. Where such information or data originates either with the Client or its consultants then Stantec shall not be responsible to the Client for the consequences of any error or omission contained therein.

When required by Stantec, the Client shall engage specialist consultants directly to perform items of work necessary to enable Stantec to carry out the Services. Whether arranged by the Client or Stantec, these services shall be deemed to be provided under direct contracts to the Client unless expressly provided otherwise.

The Client shall give prompt consideration to all documentation related to the Project prepared by Stantec and whenever prompt action is necessary shall inform Stantec of Client's decisions in such reasonable time so as not to delay the schedule for providing the Services.

When applicable, the Client shall arrange and make provision for Stantec's entry to the Project site as well as other public and private property as necessary for Stantec to perform the Services. The Client shall obtain any required approvals,

licenses and permits from governmental or other authorities having jurisdiction over the Project so as not to delay Stantec in the performance of the Services.

STANTEC'S RESPONSIBILITIES: Stantec shall furnish the necessary qualified personnel to provide the Services. Stantec represents that it has access to the experience and capability necessary to and agrees to perform the Services with the reasonable skill and diligence required by customarily accepted professional practices and procedures normally provided in the performance of the Services at the time when and the location in which the Services were performed. This undertaking does not imply or guarantee a perfect Project and in the event of failure or partial failure of the product or the Services, Stantec will be liable only for its failure to exercise diligence, reasonable care and professional skill. This standard of care is the sole and exclusive standard of care that will be applied to measure Stantec's performance. There are no other representations or warranties expressed or implied made by Stantec. In particular, but not by way of limitation, no implied warranty of merchantability or fitness for a particular purpose shall apply to the Services provided by Stantec nor shall Stantec warrant or guarantee economic, market or financial conditions, proforma projections, schedules for public agency approvals, or other factors beyond Stantec's reasonable control. Stantec does not warrant the Services to any third party and the Client shall indemnify and hold harmless Stantec from any demands, claims, suits or actions of third parties arising out of Stantec's performance of the Services.

In performing the Services under this Agreement, Stantec shall operate as and have the status of an independent contractor and shall not act as, or be an employee of the Client.

TERMINATION: Stantec may terminate this Agreement without cause upon thirty (30) days' notice in writing. If either party breaches this Agreement, the non-defaulting party may terminate this Agreement after giving seven (7) days' notice to remedy the breach. On termination of this Agreement, the Client shall forthwith pay Stantec for the Services performed to the date of termination. Non-payment by the Client of Stantec's invoices within 30 days of Stantec rendering same is agreed to constitute a material breach of this Agreement and, upon written notice as prescribed above, the duties, obligations and responsibilities of Stantec are terminated.

SUSPENSION OF SERVICES: If the project is suspended for more than thirty (30) calendar days in the aggregate, Stantec shall be compensated for services performed and charges incurred prior to receipt of notice to suspend and, upon resumption, an equitable adjustment in fees to accommodate the resulting demobilization and remobilization costs. In addition, there shall be an equitable adjustment in the project schedule based on the delay caused by the suspension. If the Project is suspended for more than ninety (90) days, Stantec may, at its option, terminate this agreement upon giving notice in writing to the Client.

ENVIRONMENTAL: Except as specifically described in this Agreement, Stantec's field investigation, laboratory testing and engineering recommendations will not address or evaluate pollution of soil or pollution of groundwater.

BUILDING CODES, BYLAWS AND OTHER PUBLIC REGULATIONS: Stantec shall, to the best of its ability, interpret building codes, by-laws and other public regulations as they apply to the Project and as they are published at the time Services commence. Furthermore, Stantec shall observe and comply with all applicable laws, ordinances, codes and regulations of government agencies, including federal, state, provincial, municipal and local governing bodies having jurisdiction over the conduct of the Services ("LAWS"). However, it is expressly acknowledged and agreed by the Client that as the Project progresses such building codes, by-laws, other public regulations and LAWS may change or the interpretation of any public authority may differ from the interpretation of Stantec, through no fault of Stantec, and any extra costs necessary to conform to such changes or interpretations during or after execution of the Services will be paid by the Client.

Stantec shall continue to provide equal employment opportunity to all qualified persons and to recruit, hire, train, promote and compensate persons in all jobs without regard to race, color, religion, sex, age, disability or national origin or any other basis prohibited by applicable laws.

COST AND SCHEDULE OF CONSTRUCTION WORK: In providing opinions of probable cost and project schedule, it is recognized that neither the Client nor Stantec has control over the costs of labor, equipment or materials, or over the Contractor's methods of determining prices or time. The opinions of probable cost or project duration are based on Stantec's reasonable professional judgment and experience and do not constitute a warranty, express or implied, that the Contractors' bids, project schedules, or the negotiated price of the Work or schedule will not vary from the Client's budget or schedule or from any opinion of probable cost or project schedule prepared by Stantec. Exact costs and times will be determined only when bids have been received for the Project and when the construction work has been performed and payments finalized.

INDEMNITY: The Client releases Stantec from any liability and agrees to defend, indemnify and hold Stantec harmless from any and all claims, damages, losses, and/or expenses, direct and indirect, or consequential damages, including but not limited to attorney's fees and charges and court and arbitration costs, arising out of, or claimed to arise out of, the performance of the Services, excepting liability arising from the negligence or willful misconduct of Stantec.

LIMITATION OF LIABILITY: It is agreed that the total amount of all claims (including any and all costs associated with such claims such as attorney and expert fees and interest) the Client may have against Stantec under this Agreement or arising from the performance or non-performance of the Services under any theory of law, including but not limited to claims for negligence, negligent misrepresentation and breach of contract, shall be strictly limited to the lesser of the fees paid to Stantec for the Services or \$500,000. No claim may be brought against Stantec in contract or tort more than two (2) years after the cause of action arose. As the Client's sole and exclusive remedy under this Agreement any claim, demand or suit shall be directed and/or asserted only against Stantec and not against any of Stantec's employees, officers or directors.

Stantec's liability with respect to any claims arising out of this Agreement shall be absolutely limited to direct damages arising out of the Services and Stantec shall bear no liability whatsoever for any consequential loss, injury or damage incurred by the Client, including but not limited to claims for loss of use, loss of profits and loss of markets.

Liability of Stantec shall be further limited to such sum as it would be just and equitable for Stantec to pay having regard to the extent of its responsibility for the loss or damage suffered and on the assumptions that all other consultants and all contractors and sub-contractors shall have provided contractual undertakings on terms no less onerous than those set out in this Agreement to the Client in respect of the carrying out of their obligations and have paid to the Client such proportion of the loss and damage which it would be just and equitable for them to pay having regard to the extent of their responsibility.

DOCUMENTS: All documents prepared by Stantec or on behalf of Stantec in connection with the Project are instruments of service for the execution of the Project. Stantec retains the property and copyright in these documents, whether the Project is executed or not. Payment to Stantec of the compensation prescribed in this Agreement shall be a condition precedent to the Client's right to use documentation prepared by Stantec. These documents may not be used for any other purpose without the prior written agreement of Stantec. The Client shall have a permanent non-exclusive, royalty-free license to use any concept, product or process which is patentable or capable of trademark, produced by or resulting from the Services rendered by Stantec in connection with the Project, for the life of the Project. The Client shall not use, infringe upon or appropriate such concepts, products or processes without the express written agreement of Stantec. In the event Stantec's documents are subsequently reused or modified in any material respect without the prior consent of Stantec, the Client agrees to indemnify Stantec from any claims advanced on account of said reuse or modification.

Any document produced by Stantec in relation to the Services is intended for the sole use of Client. The documents may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion. Any such consent will provide no greater rights to the third party than those held by the Client under the contract, and will only be authorized pursuant to the conditions of Stantec's standard form reliance letter.

Stantec cannot guarantee the authenticity, integrity or completeness of data files supplied in electronic format ("Electronic Files"). Client shall release, indemnify and hold Stantec, its officers, employees, consultants and agents harmless from any claims or damages arising from the use of Electronic Files. Electronic files will not contain stamps or seals, remain the property of Stantec, are not to be used for any purpose other than that for which they were transmitted, and are not to be retransmitted to a third party without Stantec's written consent.

PROJECT PROMOTION: Where the Client has control or influence over construction signage, press releases and/or other promotional information identifying the project ("Project Promotion"), the Client agrees to include Stantec in such Project Promotion.

FORCE MAJEURE: Any default in the performance of this Agreement caused by any of the following events and without fault or negligence on the part of the defaulting party shall not constitute a breach of contract: labor strikes, riots, war, acts of governmental authorities, unusually severe weather conditions or other natural catastrophe, disease, epidemic or pandemic, or any other cause beyond the reasonable control or contemplation of either party. Nothing herein relieves the Client of its obligation to pay Stantec for services rendered.

GOVERNING LAW: This Agreement shall be governed, construed and enforced in accordance with the laws of the jurisdiction in which the majority of the Services are performed.

DISPUTE RESOLUTION: If requested in writing by either the Client or Stantec, the Client and Stantec shall attempt to resolve any dispute between them arising out of or in connection with this Agreement by entering into structured non-binding negotiations with the assistance of a mediator on a without prejudice basis. The mediator shall be appointed by agreement of the parties. The Parties agree that any actions under this Agreement will be brought in the appropriate court in the jurisdiction of Governing Law, or elsewhere by mutual agreement. Nothing herein however prevents Stantec from any exercising statutory lien rights or remedies in accordance with legislation where the project site is located.

ATTORNEYS FEES: In the event of a dispute hereunder, the prevailing party is entitled to recover from the other party all costs incurred by the prevailing party in enforcing this Agreement and prosecuting the dispute, including reasonable attorney's and expert's fees, whether incurred through formal legal proceedings or otherwise.

ASSIGNMENT AND SUCCESSORS: The Client shall not, without the prior written consent of Stantec, assign the benefit or in any way transfer the obligations of this Agreement or any part hereof. This Agreement shall inure to the benefit of and be

binding upon the parties hereto, and except as otherwise provided herein, upon their executors, administrators, successors, and assigns.

PROTECTION OF PRIVACY LAWS: The parties acknowledge that information relating to an identified or identifiable person ("Personal Information") may be exchanged in the course of this Project pursuant to this Agreement.

The party disclosing Personal Information (the "Disclosing Party") warrants that it has all necessary authorizations and approvals required to process and disclose the Personal Information and to enable the party receiving the Personal Information (the "Receiving Party") to process it in performing the Services. The Disclosing Party will provide the Receiving Party with written notice containing the details of what Personal Information will be provided.

The Receiving Party will comply with any reasonable instruction from the Disclosing Party in respect of such Personal Information and implement appropriate technical and organization measures to protect the Personal Information against unauthorized or unlawful processing and accidental loss, theft, use, disclosure, destruction and/or damage.

The Receiving Party shall be permitted, upon prior written consent of the Disclosing Party, to transfer Personal Information outside the jurisdiction if required for performance of the Services provided that such transfers are in accordance with relevant and applicable requirements under applicable legislation. The Receiving Party shall provide the Disclosing Party with full cooperation and assistance in meeting its obligations under applicable privacy legislation, including in relation to the security of processing, the notification of Personal Information breaches, the notification of requests from individuals and Personal Information protection impact assessments.

On termination of this Agreement, the Receiving Party shall cease processing Personal Information and shall delete and destruct or return to the Disclosing Party (as the Disclosing Party may require) all Personal Information held or processed by the Receiving Party on the Disclosing Party's behalf. It is understood however, that the Receiving Party may need to keep a copy of all Personal Information for legal purposes and therefore it will continue to take reasonable steps to protect the Personal Information as outlined herein and will proceed with the destruction of the Personal Information within a reasonable period of time if there is no longer any legal justification to keep the Personal Information.

Nothing herein relieves either party from their responsibilities for compliance with applicable privacy legislation.

ENTIRE AGREEMENT: This Agreement constitutes the sole and entire agreement between the Client and Stantec relating to the Project and supersedes all prior agreements between them, whether written or oral respecting the subject matter hereof and no other terms, conditions or warranties, whether express or implied, shall form a part hereof. This Agreement may be amended only by written instrument signed by both the Client and Stantec. All attachments referred to in this Agreement are incorporated herein by this reference; however, in the event of any conflict between attachments and the terms and conditions of this Agreement, the terms and conditions of this Agreement shall take precedence.

SEVERABILITY: If any term, condition or covenant of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions of this Agreement shall be binding on the Client and Stantec.

CONTRA PROFERENTEM: The parties agree that in the event this Agreement is subject to interpretation or construction by a third party, such third party shall not construe this Agreement or any part of it against either party as the drafter of this Agreement.

THE PARTIES EXPRESSLY ACKNOWLEDGE THAT THIS AGREEMENT CONTAINS LIMITATION OF LIABILITY PROVISIONS RESTRICTING RIGHTS FOR THE RECOVERY OF DAMAGES.

The Parties, intending to be legally bound, have made, accepted and executed this Agreement as of the Agreement Date noted above.

City of Milwaukee

Stantec Consulting Services Inc.

Muhammad S. Ayeshe, Civil Engineer

 Print Name and Title

 Print Name and Title

Signature _____

Signature _____

 Print Name and Title

 Print Name and Title

Signature _____

Signature _____

Attached to and forming part of the Agreement BETWEEN:

City of Milwaukee
(hereinafter called the "Client")
- and -
Stantec Consulting Services Inc.
(hereinafter called "Stantec")

EFFECTIVE: August 13, 2021

This Attachment details the Services, Contract Time, Contract Price, Additional Conditions and Additional Attachments forming part of the above described Agreement.

SERVICES: Stantec shall perform the following Services:

Stantec will assess the pavement condition for part of the City's maintained roads network by means of an automated data collection vehicle. The pavement condition data would be collected and subsequently processed and analyzed to determine a Pavement Quality Index (PQI) for all RoadMatrix segments, within the City. The data would be formatted, as specified by the City, for upload into the City's RoadMatrix Pavement Management System (PMS).

Based on a preliminary review of the City's GIS data, a total of 1,574 survey-miles of road is expected to be surveyed in 2022. A final list of roads to be included in this project will be confirmed with City of Milwaukee project representatives, prior to commencement of the survey.

The optional tasks listed could be completed in advance of the data collection work in the Spring of 2022.

(hereinafter called the "Services")

CONTRACT TIME: Commencement Date: March 1, 2022
Estimated Completion Date: December 2022

CONTRACT PRICE: Subject to the terms below, Client will compensate Stantec as follows:

[Click and enter in any format fee and/or compensation details]

An eight percent (8%) flat rate disbursement (FRD) recovery charge will be applied to the Stantec fees to cover miscellaneous project expenses, internal incidental printing, copying and plots, film, CDs and report materials; communications expenses (e.g., faxes, office and mobile phones, blackberries, pagers, and other devices); office expenses (e.g., postage, couriers, equipment, common software and other supplies); staff local mileage/kilometrage; and archive maintenance. As this is a FRD, no supporting document will be provided with invoices.

Project specific charges, such as subconsultants; travel, accommodations and meals; project-specific printing of deliverables; consumables; usage charges for specialized field equipment and company-owned, leased or rented project vehicles; external testing lab charges and other external services charges; specialized computer software costs; and other significant project-specific expenses will be invoiced in addition to labor fees and to the FRD.

Where not stated as being included in the fees, project specific subconsultant, contractor, lab and other similar third party charges will be charged as invoiced to Stantec with a ten percent (10%) markup.

Unless otherwise noted, the fees in this agreement do not include any value added, sales, or other taxes that may be applied by Government on fees for services. Such taxes will be added to all invoices as required.

Where the Services or services conditions change, Stantec shall submit to the Client in a timely manner, documentation of the revisions to Attachment "A" adjusting the Contract Services Time and Price as required.

Unless otherwise specified, charges for Services are based on Stantec's hourly billing rate table ("Rate Table"), attached hereto. The Rate Table is subject to escalation from time to time. At a minimum, effective each January 1 during the term of this Agreement, Stantec's charges for Services shall escalate by either (a) the most current Consumer Price Index year over year percentage increase, not seasonally adjusted, for the preceding July, all items, as published by Statistics Canada (for Projects in Canada) plus 1.0%, or (b) the most current Consumer Price Index for All Urban Consumers (CPI-U) year over year percentage increase, not seasonally adjusted, for the preceding July, as published by the U.S. Bureau of Labor Statistics plus 1.0% (for all other projects).

ADDITIONAL
CONDITIONS:

The following additional conditions shall be read in conjunction with and constitute part of this Agreement:

[Click and insert additional items. If none, type 'No additional conditions' or similar wording.]

COVID-19: The parties acknowledge the ongoing COVID-19 pandemic and agree that the CONTRACT PRICE and CONTRACT TIME are based on what is currently understood. Where conditions change, the parties may have further discussions to manage and mitigate the impact of this evolving situation on the Project.

ADDITIONAL
ATTACHMENTS:

The following additional attachments shall be read in conjunction with and constitute part of this Agreement:

INSURANCE
REQUIREMENTS:

Before any services are provided under this agreement, Stantec shall procure, and maintain insurance coverage during the term of this agreement.

APPENDIX B

Sample Executive Summary



City of Stantecville
2021 Present Status &
Recommended Work Program

Existing Conditions

The City of Stantecville has a total road inventory of 545 CL-km. The paved road sections monitored for performance total 532 CL-km and are comprised of Primary Highway Connector, Arterial, Collector, and Local functional classifications.

2021 City Average PCI **73**



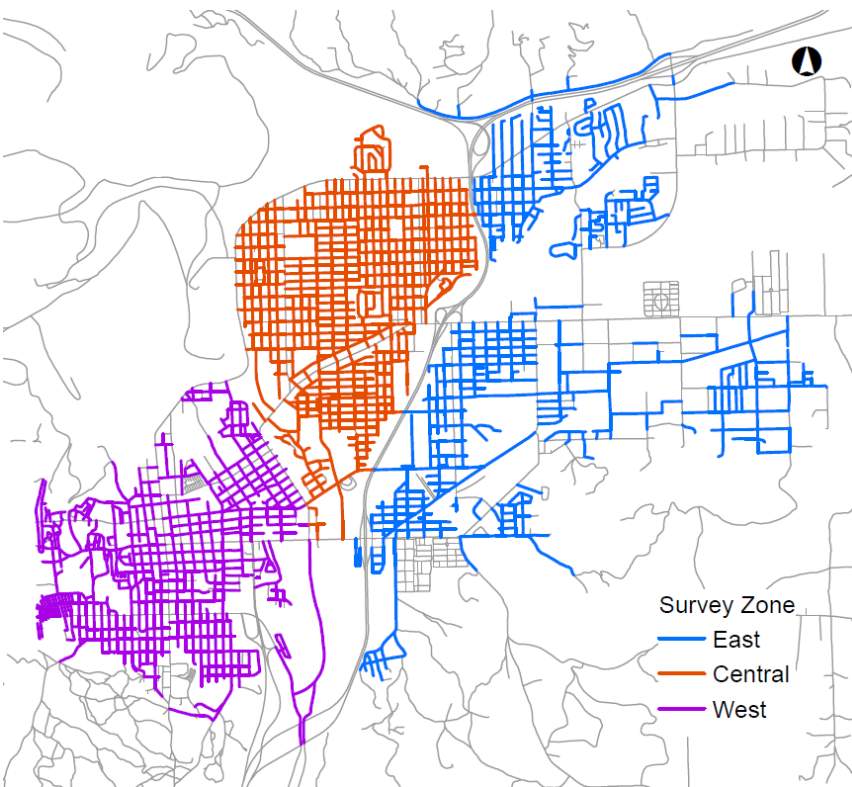
In 2021, Stantec completed a pavement condition assessment on approximately 202 survey-km of the City's paved road network in the Central Survey Zone and determined the present network status of the entire network in terms of four performance indicators: Pavement Condition Index (PCI), Structural Adequacy Index (SAI), Riding Comfort Index (RCI), and Surface Distress Index (SDI). Previously assessed sections not included in the 2021 condition assessment have been "aged" to represent deterioration to 2021.

Overall, the City has an average network PCI of 73.

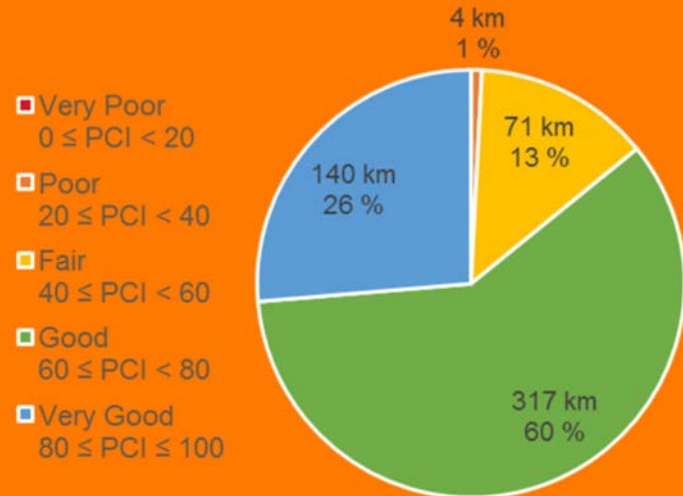
2021 Present Status Analysis Results

Functional Classification	No. Sections	Length (CL-km)	RCI	SDI	SAI	PCI
Primary Highway Connector	10	29.1	64	64	89	77
Arterial	87	130.7	62	69	70	74
Collector	272	131.4	52	72	67	68
Local	663	241.1	50	83	58	75
All Paved Sections*	1,032	532	54	76	70	73

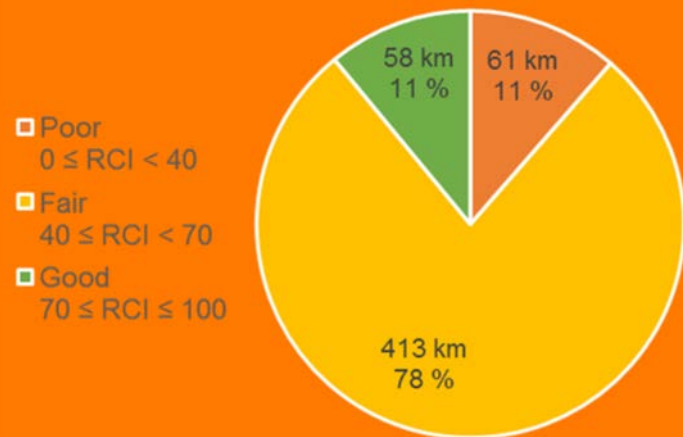
*Excludes gravel, surface treated and unknown pavement types



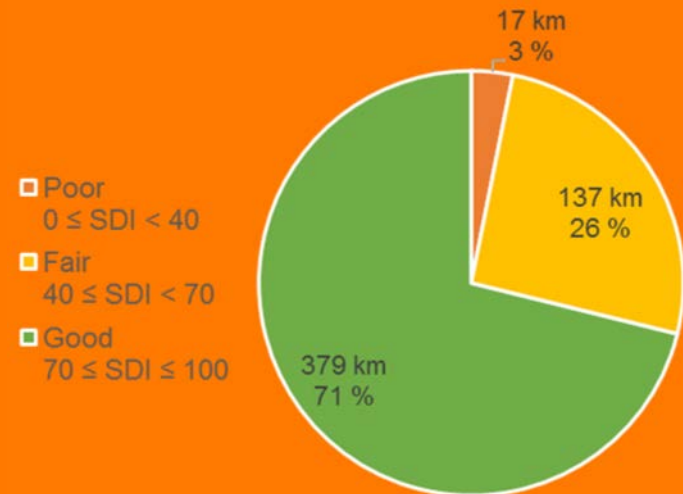
Pavement Condition Based on PCI



Pavement Condition Based on RCI



Pavement Condition Based on SDI



Needs Analysis

The paved road network has an overall good level of service, with a current deficiency of approximately 69 lane-km (13 %), i.e. the PCI scores have fallen below the PCI trigger value.

The remaining 87 % of road sections are in acceptable condition and performing above their PCI trigger value.

Functional Class	PCI Trigger Level	PCI
Primary Highway Connector	60	70
Arterial	55	56
Collector	50	54
Local	50	41

If no work is performed within the next ten years, the network deficiency will increase from 13 % to 37 % by 2023 and 67 % by 2028. An investment will be required throughout the network to maintain and/or improve level of service.

Budget Analysis

Using the City's Pavement Management System, Stantec modelled eight ten-year future funding and performance scenarios.

The impact of the various funding scenarios on network average PCI and Percent Deficiency is shown below.

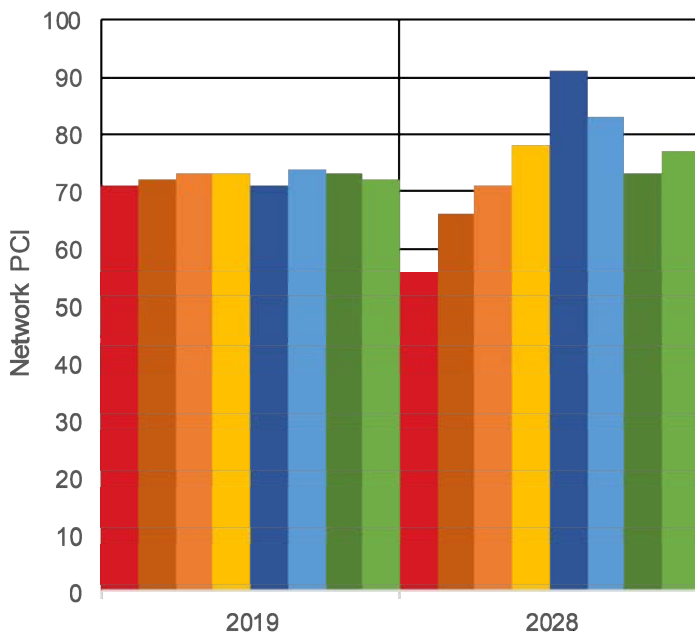
An average of approximately \$2.3 million is required on an annual basis to maintain the current level of service, i.e. a network average PCI of 73. With this budget allocation, the percent of deficient sections will increase from 12 % to 21 % at the end of year 2028.

The Needs Driven budget scenario, which recommends the most cost-effective rehabilitation strategy for each section would require \$36 million invested over the 10-year period. This funding level is predicted to increase the network PCI to 83 and reduce the percent deficiency to 2 % by the end of 2028.

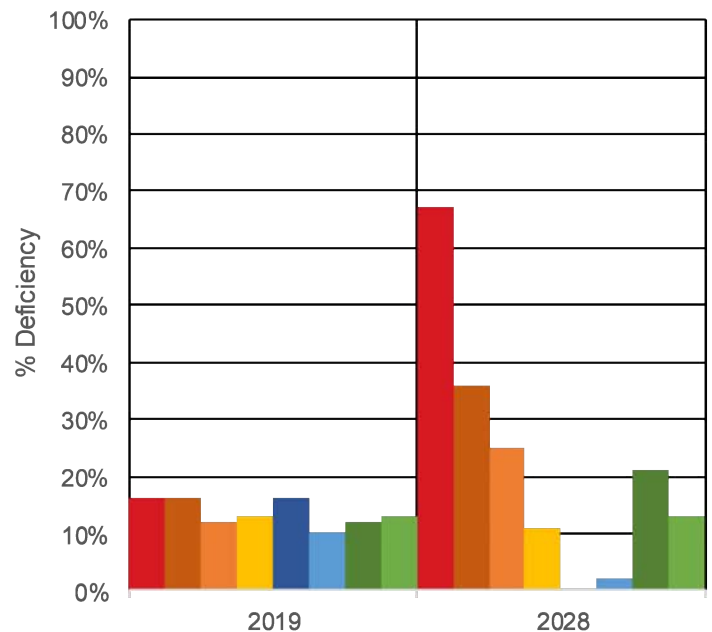
Delaying all rehabilitation and maintenance treatments until the last year of the analysis period results in the highest cost program, with \$47 million required in 2028.

Analysis Scenario	Total Cost Over 10 Years
Do Nothing Budget	\$0.0 M
\$1.3M per Year	\$ 13 M
\$2.0M per Year	\$ 20 M
\$3.0M per Year	\$ 30 M
Do Nothing First 9 Years and Do All Last Year	\$ 47 M
Need Driven Budget	\$ 36 M
Maintain 2021 PCI (73)	\$ 23 M
Maintain 2021 Deficiency (13 %)	\$ 28 M

Funding Impact on Network Average PCI



Funding Impact on Network Average Deficiency



Concluding Remarks

The majority of the paved road network assessed in 2021 is at a good service level as noted by the network average PCI of 73. On average, all functional classifications are currently performing above their minimum PCI level.

The map below shows the network coloured by PCI above or below each section's minimum PCI value. There are 69 CL-km (13 %) of roads that are red to represent deficiency (PCI below minimum level).

In order to maintain the average PCI of 73, Stantec recommends the City secure approximately \$2.3 million annually to provide effective maintenance and rehabilitation treatments and provide its users with a safe and comfortable road network.

