



**City of Kingston
Information Report to Council
Report Number 19-304**

To: Mayor and Council
From: Sheila Kidd, Commissioner, Transportation & Public Works
Resource Staff: Luke Follwell, Director, Engineering Services
Date of Meeting: November 19, 2019
Subject: Road Evaluation and Selection Process

Executive Summary:

Road maintenance is an important component of Council's priority to Improve Walkability, Roads and Transportation. The process to determine which roads will be rehabilitated in any given year requires road condition data and coordination with multiple departments and Utilities Kingston. The purpose of this report is to explain the process used to develop the list of roads that are being proposed for the 2020 rehabilitation program and explain the enhancements currently underway for planning future years.

Recommendation:

This report is for information only.

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Authorizing Signatures:

**Sheila Kidd, Commissioner,
Transportation & Public Works**

**Lanie Hurdle, Interim Chief
Administrative Officer**

Consultation with the following Members of the Corporate Management Team:

Peter Huigenbos, Acting Commissioner, Community Services	Not required
Brad Joyce, Acting Commissioner, Corporate Services	Not required
Jim Keech, President & CEO, Utilities Kingston	Not required
Desirée Kennedy, Chief Financial Officer & City Treasurer	Not required

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Options/Discussion:

The City of Kingston Engineering Department manages a road network of approximately 859km of roads in the city. Maintaining a network of this size requires knowledgeable resources and a significant amount of data collection and analysis. Selecting which roads to repair in any given year, within the approved budget envelope, is a comprehensive process. This report explains the process that was used to determine the road rehabilitation projects for 2020 and the process improvements that will be implemented over the next few years.

Frequent data collection is required because the network is ever changing due to unpredictable variables like weather, material quality and changes in use over time. Data collection begins with comprehensive condition surveys which are performed by an automated data collection process that uses continuous laser scanning technology mounted to a specialized vehicle to collect distress data (Figure 1.0 below illustrates an example of this type of vehicle). This technology scans the roadway and identifies and distinguishes between 11 different types of pavement distresses. The process involves the collection of data that identifies specific pavement distress factors such as cracking, rutting and potholes for all asphalt roads within the City of Kingston. The road segments are assigned individual pavement distress values, scored from 0 to 100, which are then weighted by importance. This weighted average of pavement distress is called an Overall Condition Index (OCI) and is calculated for each road section. A score of 100 indicates a road in new condition.



Figure 1.0: Specialized vehicle to collect distress data

A comprehensive condition survey of the road network is currently being completed on all the asphalt road surfaces in the city. The results of this survey will be available by Q1 2020 and will be utilized to select road maintenance projects for 2021 and 2022. Ideally, a condition survey should be completed at least every 3 years. The most recent survey was completed in 2011 and previous to that in 2008 and 2005. In preparation for the 2020 capital budget staff reviewed the

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historical road condition information along with data collected through the capital programs to develop road degradation curves, which produced Estimated OCI values for road sections.

The following is a summary of the current process Engineering Services utilizes including the concepts of condition, risk and performance to assign priorities for road projects.

Step 1: Technical analysis

- The estimated OCI is utilized to categorize road sections into the following conditions:
 - Very Good
 - Good
 - Fair
 - Poor
 - Very Poor
- A candidate list of road segments is developed and mapped, based on the sections rated very poor and poor. This forms the starting point for identifying the most immediate need from a condition perspective.
- The list of very poor and poor sections is then further confirmed by cross referencing the results with known conditions gathered from road patrols, maintenance requests received by public works, and field inspections.
- The road sections identified as very poor are then reviewed along with their adjacent road sections to determine if the rehabilitation project should be limited to the identified segments or expanded to gain efficiencies. Specifically, if a very poor section was connected on either side by a poor section, then the sections would be considered together as a single project candidate.

Step 2: Road segments are reviewed against known capital plans, sub-surface infrastructure health and other risk identifiers.

- The candidate list of projects is reviewed with Utilities Kingston to identify if any of the candidate project locations are planned or will require subsurface infrastructure replacement/rehabilitation within the intended life cycle of the proposed surface rehabilitation. Those candidate projects that are identified through this review are set aside from short term consideration and aligned with future capital projects.
- The remaining candidate projects are then reviewed with Transit, Active Transportation and Planning & Building to ensure that future and ongoing plans are either incorporated in the candidate project or capital works are scheduled appropriately in coordination with these groups. This process further pares down the list of candidate projects for short term consideration.
- Road segments that involve increased risk identifiers (high traffic volumes, EDR routes, emergency vehicle routes, transit routes etc.) are prioritized to the top of the list.

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Step 3: Road segments prioritization and planning

- The potential projects are then again reviewed with Transportation, Utilities Kingston, Storm Water Design and Transit to find efficiencies by bundling scopes together when both procuring and implementing the capital works.
- Candidate projects then become target projects and the preliminary project scope is further defined.
- Existing geotechnical data is reviewed where available and where it is not, it is collected by third party assignments.
- Once the existing geotechnical conditions are reviewed, the scope of remediation is then finalized; rehabilitation costs are estimated and projects that fit within the capital budget forecast are selected.
- The projects are then bundled appropriately into contract scopes and the procurement process is initiated.

Step 4: Procurement, Evaluation and Contract Award

- A procurement strategy is selected in coordination with purchasing and the procurement process is initiated.
- Submissions are evaluated based on the procurement requirements, ranked and recommended for award. This process can be extended if the procurement does not fall within the delegated authority parameters which then require council approval.
- The contracts are then prepared and executed under either council direction or delegated authority before the construction project commences.

Regular data collection and multi-year budget approval are important factors to account for the amount of time required to identify projects, execute the procurement process and complete the work within the short construction season. Furthermore the ability to initiate the procurement process early in the year often results in better pricing.

Other Considerations

- Traditionally, a “worst-first” approach has been applied to pavement maintenance which is referred to as reactive maintenance. This is the practice of fixing roads only once they have been allowed to become significantly damaged. This results in the most costly version of rehabilitation and is not a sustainable long term strategy.
- The historical data and the estimated OCI values, confirm the City has some current challenges related to the health our road network. Therefore, a balanced approach including preventative maintenance strategies coupled with addressing some of the poorest road sections has been taken.
- Candidate road sections that were rated as good but only slightly above poor, and were also in a higher criticality category were reviewed for inclusion in the preventative maintenance program. This program utilizes methods which extend the useful life of surface pavements which have not deteriorated to the point where more extensive

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rehabilitation would be required. An example of a preventive maintenance application that the City continues to use is Micro-surface technology.

A list of the 2020 road projects will be provided to Council as part of the budget deliberation process. Once budget is confirmed the approved capital projects for Transportation and Public Works will be available on the City's web site.

Future Program Enhancements

- The road condition data currently being collected using laser technology is expected to be completed by the end of November 2019.
- Once this data has been collected, staff will enter the information into the City's asset management software (Cartegraph) and begin the analysis process.
- Staff will complete a detailed analysis of this information over the first quarter for 2020 and will report to Council in Q2 2020 with the recommended road rehabilitation projects for 2021 and 2022.
- Furthermore, this data will help inform the development of a Network Pavement Preservation Strategy that will be part of the Asset Management Plan which is under development and must be completed by July 2021.

Existing Policy/By-Law:

Not applicable

Notice Provisions:

Not applicable

Accessibility Considerations:

Not applicable

Financial Considerations:

Not applicable

Contacts:

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Other City of Kingston Staff Consulted:

Anthony Simmons, Manager, Construction, Engineering Services

Exhibits Attached:

Not applicable