

Gravel Roads - Maintenance and Renewal

Recommendation

That the December 1, 2020, City Operations report CO00020, be received for information.

Previous Council/Committee Action

At the August 17, 2020, City Council meeting, the following motion was passed:

That Administration engage with independent third party experts and provide a report to Committee outlining maintenance and renewal best practices for gravel roads.

Executive Summary

During 2020, Administration engaged an external consultant to audit the current City of Edmonton maintenance practices against industry standards and to provide recommendations on the City's unpaved road maintenance program. The third party consultant confirmed that the City is following or exceeding industry best practices. The consultant also provided long term recommendations, some of which are being addressed by Administration.

As part of the development of an Asset Management Plan (AMP) for unpaved roads, Administration also engaged a second external consultant to determine the current condition of unpaved roads. This work included the formalization of condition assessment methodology and renewal practices for these assets.

Report

Gravel roads are an important part of our transportation network in lower traffic volume areas with industrial and/or rural agricultural land use. Gravel roads make up a small portion (2 percent) of the City's total road and alley network.

The gravel roads program supports the City's Movement of People and Goods outcome of ensuring Edmonton has an accessible and varied transportation system moving people, goods and services efficiently. The program also supports the Project and Asset Management outcome of ensuring the City's projects are well managed and assets are maintained for accountable service delivery. Administration has specific procedures to address the maintenance requirements of gravel roads and has

established a proactive approach to assessing deficiencies as soon as spring conditions allow.

The City does not typically build new gravel roads and has not done so in many years. Rather, the roads are historic in nature, upgraded from farming access roads, or have been inherited from neighbouring municipalities as part of land annexations required to support growth. Recently, the annexation of land from Leduc County, which substantially increased the City's unpaved road asset base by assuming ownership and responsibility of roads near Devon, Nisku and Beaumont. A portion of these roads are being upgraded with recently approved Municipal Stimulus Program funds.

Gravel Road Inventory

The City owns approximately 300 kilometres of unpaved road assets (including the recently annexed area). About 60 percent of the inventory is oiled roads (roads with a binding surface treatment of bituminous oil) and 40 percent are roads and alleys with only a gravel surface. The current inventory and a map of gravel roads is included in Attachment 1.

It is worth noting that a substantial portion of gravel roads have been annexed to the City. For these roads, there is no information regarding the construction standard they were built to. For example, Leduc Annexation represents 20 percent of the total City inventory of gravel roads (Attachment 1).

Current Maintenance Practices

The purpose of City maintenance activities is to preserve the condition of gravel roads as close to their intended or as-constructed state to ensure an acceptable level of service. Administration has been maintaining gravel roads for many years by establishing and following internal standardized procedures in line with industry best practices to address road deterioration.

Current routine maintenance activities on gravel roads include road inspections, grading, pothole filling, gravelling, dust suppression and drainage clearing. The criteria to determine which specific maintenance task is performed depends on the type of deficiency that needs to be addressed, as shown in Attachment 2.

Traffic volumes, vehicle weight, and extreme weather, such as significant precipitation, are the main contributors to the deterioration of gravel roads. The rate of deterioration may also be accelerated by factors such as construction standards (i.e., material quality) and drainage deficiencies.

Administration focuses on reducing the rate of deterioration by performing maintenance activities that target the key deterioration factors identified by the U.S. Department of Transportation, Federal Highway Administration; Gravel Roads

Construction & Maintenance Guide (Attachment 3). This document provides tolerances for road characteristics to be maintained.

Gravel road conditions change rapidly, and defects often need to be addressed within a short timeframe. Administration performs routine inspections, however many of the maintenance activities on gravel roads are a result of inquiries or requests from the public, which are then planned and scheduled.

Independent Third Party Review

The City engaged an external consulting company to perform an engineering review of maintenance practices on the City's gravel roads. The Leduc annexation area was selected for review because of the work taking place in this area at the time of the consultant's review.

The consultant's review of the City's maintenance program confirmed that effective repair procedures and resource allocation are in place to meet or exceed industry expectations. The consultant assessed that City maintenance personnel "were observed to be functioning effectively through various forms of gravel or oil mix roadway repair, and all operators and crew members were viewed as competent" (Attachment 4, page 15).

The consultant compared the City of Edmonton's gravel road and oil mix road repair process for potholes, cracking, and re-grading gravel with road crown rehabilitation (washboarding, rutting, settlement) against standard industry practices from other municipal or private construction work. The consultant held the City of Edmonton's maintenance work to the same standard of care that is enforced on developers throughout the City as part of the overall land development process. IBI Group also accounted for general best management practices defined through the Transportation Association of Canada (TAC), and the American Association of State Highway and Transportation Officials (AASHTO), and various municipal and provincial regulatory bodies within Canada (Attachment 4).

Overall, the maintenance crews were observed as working efficiently and effectively, no operational errors or process inconsistencies were observed and City equipment operators showed capable skills, with no immediate visible workmanship issues.

Other long term recommendations specific to the Leduc Annexed Areas (where the assessment was carried out) were identified by IBI Group (Section 5, page 11 of Attachment 4). Some of these recommendations are already underway, and some require development intervention to be addressed (See Development Related Upgrades to Unpaved Roads, below).

Unpaved Roads Maintenance Guidelines for all unpaved roads in the City can be found in Attachment 5.

Asset Condition

Early in 2020, a condition assessment on the full City of Edmonton inventory of gravel and oil roads was completed. A total of 303.69 kilometres of roads were assessed (including the Leduc Annexed roads) indicating that, at the time of assessment, 36 percent of unpaved roads and alleys are in Good and Very Good condition, 49 percent are in Fair condition, and 15 percent are in Poor and Very Poor condition. Details on the methodology and overall condition results are shown in Attachment 6.

Current Asset Management Principles Around Renewal Decisions for Gravel Roads

Currently, gravel roads are governed by Infrastructure Asset Management Policy C598, which states the City's obligation to maintain and manage assets at the defined level of service. The policy recognizes that levels of service can change over time, and therefore the City must monitor standards and service levels to ensure they continue to support community and Council expectations and objectives, as well as legislative and/or regulatory compliance. The City employs a strategy of perpetual maintenance, for unpaved road assets. In general, much of the maintenance for these assets is preventive (or planned) maintenance through regular blading activities, with unplanned maintenance triggered by customer service requests. Rehabilitation or reconstruction would be completed when maintenance is no longer deemed feasible.

Administration aims to maintain gravel roads in perpetuity until they are upgraded to paved roads by private investment as part of the land development process, whereby rural land is converted to residential or industrial land. The exact time frames for roads to be upgraded are largely subject to the local economy and demand for new development. The City does have some long term programs in place which will upgrade some unpaved roads such as the Alley Renewal Program. However, this program is focused on reducing the number of alleys in poor and very poor condition, and not specifically on upgrading unpaved alleys to a paved surface. The City recently received funding under the Municipal Stimulus Program, of which \$43 million has been targeted at upgrading existing industrial and rural unpaved roads to a paved surface. The details of implementation are still being finalized. However, the impact of this work will be a reduction in the number of unpaved roads assets, as these will have been upgraded to new paved road assets.

When maintenance activities on unpaved roads cease to be effective in ensuring the road is meeting appropriate service levels, Administration may consider rehabilitation or upgrading those roads on a case-by-case basis as funding permits.

Development Related Upgrades to Unpaved Roads

The process to develop areas with gravel road assets in them includes the creation of an Area Structure Plan that provides specifics about land use, road location and classification, storm ponds and drainage requirements, among other considerations. The Area Structure Plan is typically initiated by private developers interested to invest

and develop in these areas and is reviewed by Administration. The Area Structure Plan is brought to Council for approval along with an amendment to Bylaw 14380 - Arterial Roads for Development to outline the developer responsibilities and cost share arterial road upgrades. Council then approves Neighbourhood Structure Plans and Zoning Bylaws in the developing area. Roadway upgrades are conditioned with subdivisions and the developers enter into a Servicing Agreement with the City to commit to construction within a three year timeframe. This process can take several decades from an Area Structure Plan to construction.

Corporate Outcomes and Performance Management

Corporate Outcome(s): Goods and services move efficiently			
Outcome(s)	Measure(s)	Result(s)	Target(s)
People and goods travel to their destinations safely and efficiently using the Edmonton road network	Percentage of oil/gravel roads in Edmonton that are in poor/very poor condition	15.5% as part of 2020 condition assessment	TBD

Attachments

1. Unpaved road - Asset Classification and Inventory
2. Maintenance Tasks on Gravel Roads
3. Gravel Roads Construction and Maintenance Guide - FHWA
4. IBI Group - Leduc Annex - Maintenance Review - Engineering Assessment
5. COE Unpaved Roads Maintenance Guidelines - Final Draft
6. 2020 Condition Assessment of Unpaved Roads - methodology and results
7. Unpaved Roads Asset Management Plan

Others Reviewing this Report

- M. Persson, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- J. Meliefste, Acting Deputy City Manager, Integrated Infrastructure Services
- S. McCabe, Deputy City Manager, Urban Form and Corporate Strategic Development