CITY OF SALMON ARM

File: 2019-47

TO: His Worship Mayor Harrison and Members of Council

FROM: Robert Niewenhuizen, Director of Engineering and Public Works

PREPARED BY: Jenn Wilson, City Engineer

DATE: January 29, 2021

SUBJECT: **LAKESHORE ROAD STABILIZATION – OPTION SELECTION**

STAFF RECOMMENDATION

THAT: Staff be authorized to proceed with the preliminary design of the Lakeshore Road Stabilization project based on Option 1 included within the 'Cost-Benefit Analysis for Road Rehabilitation of Lakeshore Road NE between 10th Ave NE and 20 Ave NE, Salmon Arm' (Onsite Engineering Ltd., 2020)

BACKGROUND

Lakeshore Road NE between 10 and 20 Avenue NE has been subject to ongoing failures over many decades and several failures in the last few years. Several geotechnical studies have been commissioned over this stretch of roadway and many improvements completed reducing the severity of the failures.

Due to a multitude of failures over a short period of time, the City commissioned a geotechnical review of the entirety of the approximately four (4) kilometer section of Lakeshore between 10 and 20 Avenue NE. The report titled 'Geotechnical Investigations and Report; Lakeshore Drive NE Slope Assessment; From 10th Ave NE to 20th Ave NE, Salmon Arm, BC' was completed by Fletcher Paine Associates Ltd. (FPA) and dated August 16, 2018. The report indicated that portions of roadway had concerning factors of safety and were subject to potential catastrophic failure.

The City subsequently commissioned a cost/benefit analysis of future rehabilitation options; Onsite Engineering Ltd. (OEL) was the successful proponent and completed the report in the winter of 2020.

OEL reviewed the site and previous geotechnical reports and conducted further geotechnical inspections and reviews (such as water table monitoring). The report concluded that there are multiple locations that have a high risk of damage to the Road Infrastructure and high risk of injury/loss of life. Presence of water can exacerbate slope instability significantly and as such various potential water sources are identified.

Short-term recommendations were identified that lower the risk to moderate to low for risk of injury/loss of life and moderate to low (with one exception) of damage to the road infrastructure and are represented in Options 1 to 3 discussed below. A fourth option, ongoing patching and repairs were included for comparison purposes only.

Option 1: Two-way Urban Collector Road with AT Corridor

Lakeshore Road is reconstructed as a two-way Urban Collector road with the addition of active transportation facilities. The report considers construction of a multi-use path on the north side of the road and sliding the majority of the road to the south where possible to improve the overall factor of safety. Drainage improvements are recommended throughout to provide safe drainage paths for surface and groundwater and drain groundwater sources as appropriate. Replacement of the aged watermain along Lakeshore is recommended to avoid catastrophic failure. In this option the MUP would likely be subject to failure over time (higher maintenance costs as compared to an average MUP) as it would be located mostly along the top of slope; however, due to slower speed and lower volumes and weights of users, the risk is considerably lower for a MUP versus a roadway. Option 1 requires the most amount of land acquisition as the road requires shifting further to the south. Option 1 is estimated to cost $2,200,000 (Class 'D' OPC).

Option 2: One-way Urban Local Road with AT Corridor

Lakeshore Road is reconstructed as a local traffic only one-way Urban Local road with the addition of active transportation facilities. The report considers removing the north lane and replacing it with a multi-use path. Drainage improvements are recommended throughout to provide safe drainage paths for surface and groundwater and drain groundwater sources as appropriate. Replacement of the aged watermain along Lakeshore is recommended to avoid catastrophic failure. Option 2 requires minimal land acquisition. Option 2 is estimated to cost $1,600,000 (Class 'D' OPC).

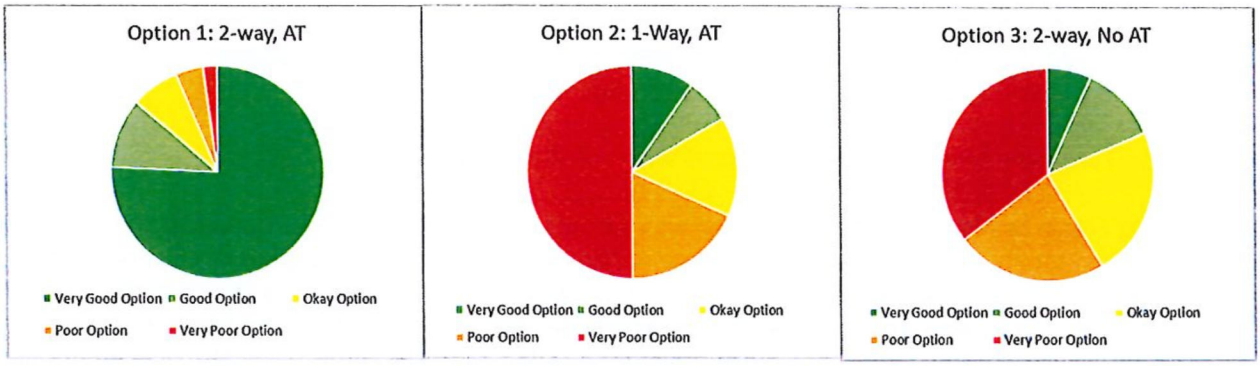
Option 3: Two-way Urban Collector Road without AT Corridor

Lakeshore Road is reconstructed as a two-way collector road without the addition of active transportation facilities. The report considers sliding the majority of the road to the south where possible to improve the overall factor of safety. Drainage improvements are recommended throughout to provide safe drainage paths for surface and groundwater and drain groundwater sources as appropriate. Replacement of the aged watermain along Lakeshore is recommended to avoid catastrophic failure. Option 3 requires a moderate amount of land acquisition; some land is required to shift the road to the south. Option 3 is estimated to cost $1,800,000 (Class 'D' OPC).

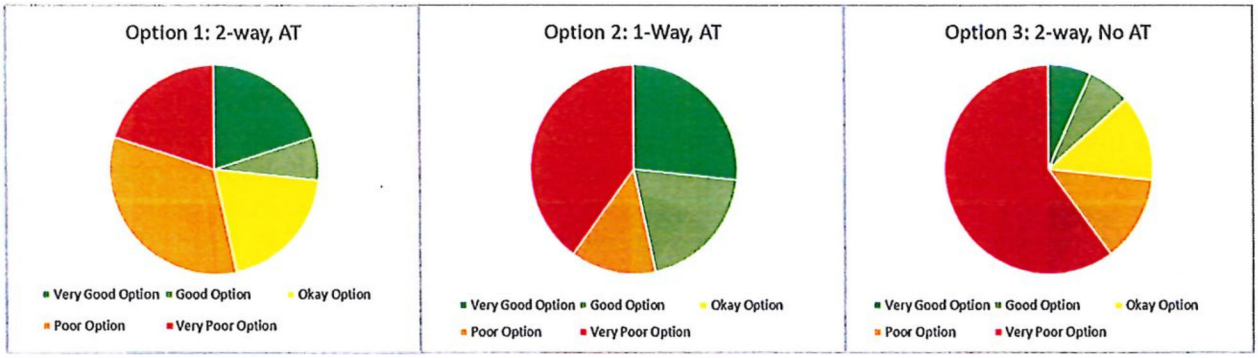
Option 4: Patch and Repair

Lakeshore Road would be patched and repaired as necessary. This leaves the high risk to injury/loss of life and damage to the road infrastructure. Option 4 requires no land acquisition. Option 4 is estimated to cost $600,000 (Class 'D' OPC).

Council directed Staff to request feedback from the public regarding Options 1, 2 (Southbound One-way) and 3. Approximately 570 submissions were received. A visual summary of the results is presented in the pie charts below.



The residents fronting the affected portion of Lakeshore had a significantly different view point from the average respondent. Approximately 1/3 to ½ of the fronting residents responded to the request for input. A visual summary of the responses from the fronting residents is presented in the pie charts below.



STAFF COMMENTS

Staff reviewed the options from several perspectives as discussed below.

Road Connectivity

Lakeshore Road between 10 and 20 Avenue NE is identified as an Urban Collector Road in the Official Community Plan and forms an integral part of Salmon Arm's road network. The only detour available should Lakeshore be downgraded into a one-way road for users to and from the downtown would be along 20 Street NE, 11 Avenue NE and 10 Avenue NE. At best the detour would add 800m and would add significant pressure to the intersection of 20 Street and 11 Avenue NE. At worst, homeowners along Lakeshore could be subject to up to a 3km detour to get around and back to their homes when traveling against the one-way designation. Due to the significant distance of the detour, it is likely that enforcement of one-way traffic will be difficult.

One-way traffic will also result in additional costs from external intersection and road improvements necessary to accommodate the increase of traffic along the detour routes. The added distance of the detour routes appears to be an inefficient solution in respect to dealing with the traffic flows, travel time and from an environmental point of view.

Two-way traffic provides better connection and keeps redundancy in the road network in case of a failure (downed trees, slope failure, etc.) or planned closure (utility maintenance and repair). An example to consider is how traffic would flow in each the one-way and two-way scenarios if the affected portion of Lakeshore had to be closed to through traffic to replace a sanitary service. Maintaining the existing traffic patterns will help elongate the service life of the surrounding roads and intersections.

Traffic Safety

Although one-way traffic is generally considered safer for vehicular traffic by eliminating risk of head-on collisions, staff are concerned about the safety of Option 2. Due to the lack of connectivity of the road network surrounding the subject portion of Lakeshore Road the 'detour' length is 3km in length which will likely result from users 'cheating' the one-way routing. Response time for emergency services could be affected to the surrounding areas especially if coupled with other emergency factors such as damage caused in severe wind storms that often result in road blockages.

All three road improvement options result in narrowed laneways (3.5 – 3.8m) constrained by roadside barriers and curbing. Narrowed roadways and visual obstacles have been proven to result in traffic calming and increased safety. It is noted that Option 3 has slightly wider lanes than Option 1 and 2 and would therefore likely see higher speeds than the other two options.

Active Transportation

The Official Community Plan includes a proposed greenway along the subject stretch of Lakeshore Road. This route connects the downtown core to major residential development and is a relatively straight, flat route. There is connectivity to Dodd's trail and unofficially to the foreshore trail at 17 Avenue NE. Staff continue to support the OCP recommendation and overall Active Transportation goals and believe the slope stabilization improvements along Lakeshore offer a unique opportunity to improve the Active Transportation Network to include a safe separated Multi-Use path along the subject area.

Staff presented Options 1, 2 (southbound) and 3 to both the Greenways Liaison Committee and the Active Transportation Committees as part of the public consultation process. The Greenways Liaison Committee supported Option 1 and the Active Transportation Committee supported any Option that included an Active Transportation Corridor (Option 1 and 2).

Land Acquisition

Land Acquisition can be difficult and can add cost and significant delays to a project. Responses from the property owners along Lakeshore indicated that they are generally not supportive about having the roadway moved closer to their homes or giving up additional land. Option 1 requires acquisition from ten (10) properties totaling approximately 1162 m^2, Option 2 from three (3) properties totaling approximately 32 m^2 and Option 3 from ten (10) properties totaling approximately 550 m^2. It is anticipated that significant project costs may be added in order to offset issues created for the fronting property owners.

Staff Recommendation

Further to the above, despite the property acquisition obstacles, staff recommend that Council authorize staff to proceed with the next steps of the Lakeshore Road Stabilization project, which is the preliminary/detailed design, based on Option 1 – two-way Urban Collector road including Multi-Use Path. This option best achieves the Official Community Plan goals. Staff are optimistic that the addition of the multi-use path, frontage improvements (curb & gutter, drainage), and other potential project additions such as fencing or vegetation screening will be incentive for homeowners to work cooperatively with the City.

The highest priority is to minimize the risk to the public while maintaining current service levels. Staff note that installation of the multi-use path is an increase to the current service level.

Staff originally envisioned four phases to the project; however, further to public feedback regarding the importance of the active transportation route, staff now suggest Phase 3 & 4 be completed together:

Phase 1: Preliminary and Detailed Design of the road improvements and multi-use path;
Phase 2: Underground improvements (replacement of watermain, installation of drainage improvements);
Phase 3: Road improvements (road structure, paving, curb and gutter); and
Phase 4: Multi-use Path construction

The City included funding for Phase 1 and 2 works within the 2021 budget. Phase 3 & 4 would be included within the 2022 budget and staff envision applying for grants for Phase 4.

Council may also wish to consider additional measures to meet concerns raised by the fronting residents such as restricting commercial truck traffic along the route or additional traffic calming measures to reduce travel speeds. Introducing significant traffic calming would 'encourage' use of alternate routes but protect the connectivity of the overall road network.

Respectfully submitted,

Robert Niewenhuizen, AScT
Director of Engineering and Public Works