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Staff Report

Infrastructure & Public Works

Report To: Committee of the Whole
Meeting Date: August 22, 2016
Report Number: CSPW.16.117
Subject: Clearing Snow from Cul-da-Sacs
Prepared by: Jim McCannell, Manager of Roads and Drainage

A. Recommendations

THAT Council receive Staff Report CSPW.16.117 entitled "Clearing Snow from Cul-da-Sacs";

AND THAT Council directs Staff continue with the current level of service provided within cul-da-sacs and to monitor snow accumulation for operational efficiencies and to load and haul snow as warranted.

B. Overview

During the winter of 2016 the Town received comments from a resident of Thornbury asking Staff to consider other methods of clearing and storing snow in cul-da-sacs. The request was to look at alternative equipment that could direct snow away from the end of driveways as the clearing of the windrow from driveways was burdensome on the residents. The Town routinely receives calls concerning the windrow that is left at the end of resident's driveways on urban roads, especially within cul-da-sacs.

This report will consider options for snow removal within cul-da-sacs to reduce the amount of snow accumulation at driveways on the right-hand side of cul-da-sacs.

C. Background

During the January 11th, 2016 Committee of the Whole meeting, Staff was directed to provide a report on the snow removal process and distribution of snow in all cul-da-sacs from Town plows, along with the associated cost implications.

The Town uses fixed one way snow plows for both rural and urban roads. These plows are designed to throw the snow to the right-hand side well off the roadway. See the picture below for a typical one-way plow arrangement.

The faster the trucks travel the further the snow is thrown from the roadway. Getting the snow well off the roadway is important to prevent snow banks from getting too high which can exasperate drifting leading to additional service requests and increased costs. Large snow banks also narrow the traveled portion of the road and reduce sightlines resulting in safety hazards. Throwing the snow to the backside of the ditch ensures there is snow storage space for future snow events and increases cycle time between plowing rounds. The one-way plows are constructed so that the maximum throwing distance is achieved at around 40 km/hr. In the rural areas this works very well. In urban areas however where the truck speed is reduced, the one-way plows simply push the snow to the side of the travelled portion of the road where the wing plow pushes it a little farther. The truck is not able to gain sufficient speed in urban areas to throw the snow beyond the shoulder of the road.

Cul-da-sacs are a specific challenge for snow removal operations. The trucks must travel slowly in cul-da-sacs and so only move snow to the right side of the plow and wing. In addition, the truck is unable to make a continuous circle of the cul-da-sac and must “dump” its snow to re-position to move around the cul-da-sac. As a result, driveways along the right hand side of a cul-da-sac receive more pushed snow than driveways on the left side of the cul-da-sac.

Staff is aware of the problem snow accumulation on the right-hand side of cul-da-sacs and routinely monitors the situation. As snow storage space becomes limited, Town crews relocate snow around the cul-da-sac by frontend loader to balance the amount of snow that is placed on the boulevard in front of each property. This exercise is done as needed but generally occurs 2 or 3 times each winter. If necessary, snow is hauled away. It is much less expensive though to balance snow around cul-da-sacs than to load and haul. Moving snow is an operation that is completed in between snow events when crews are also clearing snow for sightlines and exposing signs. Once there is no further room to store snow, it is loaded and hauled away.

Some cul-da-sacs have sufficient room for snow storage or don't have driveways on the right hand side. At these locations snow storage is not a concern. Other cul-da-sacs have several driveways along the right-hand side and have very limited storage areas. Staff estimate there are around 12 cul-da-sacs in the Thornbury / Clarksburg areas that would be candidates to special consideration for snow removal and up to 30 in the Camperdown / Craigleith areas. In total, the Town has more than 60 cul-da-sacs and dead ends with another 10 in the design and construction phase.

Alternative Snow Clearing Methods

Staff contacted other municipalities to learn about their means of managing snow removal within cul-da-sacs. All agreed that cul-da-sacs are a challenge but none had the same mix of rural and urban roads on the same plow route. This situation has come about as the Town has grown and urbanized.

The other methodologies primarily used by other municipalities fall into the following categories:

i. Use of two-way plow
ii. Enhanced loading and hauling
iii. Plow to centre

To this list, Staff also added the idea of clearing identified driveways as an option. Staff felt the idea of plowing snow to the centre of a cul-da-sac as problematic. A pile of snow will become an attraction for children playing, requires the plow operator to maneuver the "wrong" way around the cul-da-sac, increases the need to load and haul snow, causes icing problems as snowmelt re-freezes during cold nights, requires a larger than normal cul-da-sac, and becomes a sightline challenge for motorists. As a result, Staff did not feel the "plow to centre" concept warranted further consideration.

Staff reviewed the following alternatives as listed below to undertake snow removal in cul-da-sacs.

1. One-way plow as is the Town's current standard
2. Two-way plows for all plow plows within urban areas
3. Clear identified driveways
4. Dedicated cul-da-sac route

Alternative 1: One-Way Plow

This is the "Do Nothing" option and involves conducting snow removal practices currently undertaken by the Town. A one-way plow will continue to be utilized to remove snow on rural and urban routes that have been optimized to minimize the cost of snow removal. The challenge of snow accumulation in driveways on the right-hand side of cul-da-sacs will be addressed by the Town re-locating snow around the cul-da-sac by frontend loader as needed and able, and through the loading and hauling snow as necessary.

This alternative becomes the base level of service against which to compare the other alternatives. The Town's stated level of service is to satisfy the requirements of O.Reg. 239/02 Minimum Maintenance Standards for Municipal Highways. Any increase in level of service will come at a cost.

Alternative 2: Two-way Plow

Since two-way plows are used in more urbanized municipalities, had the most promise to be a workable alternative and could be easily tried, Staff contacted Arnott Construction, the Town's winter control contractor, to explore the use of a two-way plow. Arnott was able to supply a two-way plow for their truck used on the Thornbury route as a trial in winter of 2016. The truck equipped with the two-way plow is shown in the picture below.

The two-way plow worked well in the urban areas, during low snow fall events, and at slow speeds. The Operator was also able to move snow around well within the cul-da-sacs. The additional time needed was not significant during the low snow fall events. Conversely, the two-way plow did not work well in the rural areas. The two-way plow was not able to throw the snow off the road. The plow required the truck to travel at slower speeds than a one-way plow. In addition, the two-way plow is lighter and was not able to scrape the hard packed snow off the roads as efficiently as a one-way plow. As a result, a second truck was needed to follow up to ensure the rural section of the route was cleared well. During heavy snow events the two-way plow was found to be too small to efficiently move the accumulated snow. The travel time on the Thornbury route increased dramatically and the Town received calls about the delay in service. Following a particularly heavy snow event in March, the Arnott operator had the two-way plow removed and the original one-way plow was reinstalled.

Staff have learned that two-way plows work well within fully urbanized areas where travel speeds are reduced, snow does not accumulate to the same degree as rural areas, and flexibility in placement is required. Staff feel that the introduction of two-way plows within the urban areas will require the reallocation of plow routes and likely the introduction of one and perhaps two additional routes. This will mean adding trucks and operators either internally or by contracted services.

Alternative 3: Clear Identified Driveways

This alternative includes using a pickup truck or tractor with a two-way plow to clear the end of laneways after the one-way snowplow truck has cleared the traveled portion of the road. The concept is that this piece of equipment will follow the plow truck to clear identified driveways within cul-da-sacs that are prone to excessive snow accumulation from the one-way plow.

For this enhanced level of service, Staff have received a quote of $350 per lane way per season. With the assumption that there were 3 laneways to clear in most cul-da-sacs, the cost is estimated to be $12,500 for Thornbury and Clarksburg for 12 cul-da-sacs. This price would not include the estimated 25 dead end sections that do not have cul-da-sacs but which could include driveways where snow accumulates from the one-way plow. Staff expect that there will be requests to expand service additional to include the 30 cul-da-sacs in the Craigleith and Camperdown areas. The cost for these cul-da-sacs is estimated to be $31,500. The total becomes $44,000. Staff have priced using a frontend loader but the cost is higher. An option instead of a fixed price contract to pay on a time and materials basis. The costs may reduce but there will be cost uncertainty.

Staff expect that once this driveway clearing service is initiated, there will be pressure to expand the service to all entrances around the cul-da-sacs and even outside of cul-da-sacs.

Alternative 4: Dedicated Cul-da-Sac Route

This alternative involves dedicated equipment to clear only cul-da-sacs and the road leading to them. The advantage is that specialized equipment with a two-way plow could be used more

efficiently to reduce the windrowing into laneways. Residents would still be required to clear their own laneways with what may end up in their driveways.

The average time need to clear a cul-da sac is estimated to be 20 minutes with 10 minutes of travel time for a total of 30 minutes per site. Twelve cul-da-sacs in Thornbury and Clarksburg would require a minimum of 6 hours to clear. The challenge would be coordinating this work with the regular plow routes. Typically, drivers will expect the main roads to be cleared first and will wait some for cul-da-sacs to be cleared later. The cul-da-sac equipment will need to "follow" shortly after the main road plow to meet the expectations of residents and satisfy the Town's mandated maintenance standards. Salting and sanding of cul-da-sacs will be a challenge if the cul-da-sac equipment doesn't also salt and sand.

Assuming that 3 tractors were used to clear the cul-da-sacs and the roads leading to them throughout the Town in an 8 hour shift, the cost for this service is estimated to be $91,000. This doesn't include salting and sanding afterwards however this cost may be offset in the savings of not having because a plow truck navigate cul-da-sacs. The assumption of future cul-da-sacs would require additional equipment and increase costs accordingly.

D. Analysis

Staff have reviewed alternatives for enhanced snow removal on cul-da-sacs as listed below and described the conceptual costs implications. Those ranged from the additional of new snow plow trucks routes for Alternative 2 to additional contract servicing costs in the area of $44,000 to $91,000 for Alternatives 3 and 4 respectfully.

1. One-way plow as is the Town's current standard
2. Two-way plows for all plow plows within urban areas
3. Clear identified driveways
4. Dedicated cul-da-sac route

Considering the additional costs to specifically manage cul-da-sacs and the potential for the costs to grow as others demand a similar level of service, Staff recommend that the Town continue with its current practice of using one-way mounted snow plows and monitor snow accumulation to find operational efficiencies and to load and haul snow as warranted.

Staff are planning to review all its snow plow routes following the 2018 winter in anticipation of several new residential developments being completed. The Contract with Arnott Construction also expires in April of 2018 which will provide an opportunity to review the Town's practice regarding snow removal for implication in 2018/2019 winter control season.

Upon Council's direction, Staff can continue to explore and mature one or two of the alternatives to refine the costs and staffing implications.

E. The Blue Mountains Strategic Plan

Goal #5: Ensure Our Infrastructure is Sustainable

F. Environmental Impacts

The use of heavy equipment produces greenhouse gases, the Contractors will be asked to participate in the Town's anti idling policy.

G. Financial Impact

If Council approves the recommendation as printed there will be no increase to the level of service offered by the Town for the removal of snow in cul-da-sacs and therefore no increase to the annual budget.

H. In consultation with

Brian Kane, Foreman Roads and Drainage

I. Attached

None.

Respectfully submitted,

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