

Current Level of Service

The City of Surrey currently provides snow and ice control on all arterials, major collectors and roads with steep grades (regardless of road classification).

First Priority: Arterial roads, major collector roads, bus routes and hilly areas (regardless of road classification) are given first priority. Sanding and plowing are carried out, around the clock, as long as poor conditions exist.

Second Priority: Secondary through roads in residential areas. These roads exist between the arterial or major collector road grid. They are typically over 200 meters in length and connect local traffic with either an arterial or major collector roadway. All secondary priority work is performed during normal work hours only.

Third Priority: All remaining residential roads. Third priority routes will be only done as directed by the General Manager of Engineering or his delegate. The General Manager of Engineering shall inform Council of the decision to address third priority routes. These areas will be dealt with in a systematic manner starting with the more significant roads, hill areas, specific problem locations (as identified by the public and Area Managers). All third priority work is performed during normal work hours.

First priority routes are maintained until the conditions are under control; only then are resources redirected onto second priority routes. Once conditions are under control on secondary routes, resources can be directed to third priority routes. As soon as conditions deteriorate on any of the first priority routes, resources are moved back to those routes.

Snow removal and snow plowing occur only on an area-wide basis when the snow depth exceeds 10 centimetres (4 inches).

A copy of Surrey's existing full Snow & Ice Control Policy is contained in Appendix 1.

Benchmark Results

Staff carried out a benchmark of local municipalities to determine snow removal service level priorities and the amount of equipment available compared to the City of Surrey. Results from the jurisdictions that responded indicate that Surrey's current snow removal policy is consistent with other jurisdictions with the exception that our policy contains the ability to direct crews onto residential streets (Third Priority streets) under the direction of the General Manager Engineering. This additional service has only been used in the past under extreme storm conditions that have lasted beyond 3 weeks in duration. The comparison of priorities for snow removal for other municipalities is shown in Appendix 4.

Road Network

As mentioned above, the City divides the road network into three service categories. These roads are shown in the attached maps in Appendix 2 and are as follows:

Priority Levels	Description	Map Code
First Priority	Major Arterials (large plows/sanders)	Red coded
	Major Collector (large plows/sanders)	Red coded
	Hillside roads (grader/small truck routes)	Blue coded
Second Priority	Local Connector Roads (large plows/sanders)	Green coded
Third Priority	Remaining Residential Roads	No colour

The City's policy and related procedures strike a balance between providing major road access and prudent maintenance expenditures. Normally, snowstorms within the Lower Mainland region are short in duration and the melt occurs prior to our ability to enter residential streets (Third Priority streets).

For winter maintenance purposes the total road network is calculated on "pass kilometres" as one pass will cover 2 lanes in one direction but on a two-lane road we must travel in both directions. Essentially each kilometer of road equals 2 pass kilometres. The following table provides additional information in this regard:

Priority Levels	Description	Pass Kilometres	% of Total
First Priority	Arterial, Collector, Hills	1,546	42%
Second Priority	Connector Roads	696	19%
Third Priority	Residential Roads	1,404	39%

Total 3,646 pass km

The average snowfall events for Surrey are comprised of short duration storms where we are typically able to address First Priority routes when there is continuous snowfall. After 48 hours of no snowfall and all First Priority routes are cleared, we are able to focus on Second Priority routes. Usually residential streets are covered with compact snow and while plows are utilized for snow removal, they are not capable of scraping to asphalt, but rather only move loose snow and apply salt and/or sand.

Appendix 3 summarizes the snow and ice removal fleet which increased in 2005 when Surrey took over maintenance of King George Highway and Fraser Highway from the Province's contractor, Mainroad Contracting. Through equipment replacement, we have been able to increase the carrying capacity of some of the trucks, and have kept older trucks for occasional usage such as snow removal. This has increased our overall ability to respond during snowfall events. When snowfalls occur, we operate on a 24-hour, 7-day a week basis with all available equipment until the first priority roads are clear.

Budget

Our current winter maintenance budget for snow and ice removal is \$1,098,500 of which \$428,200 is recoverable for TransLink (Major Road Network) roads. Expenditures from January 1, 2007 to date are \$1,352,500, an over-expenditure of \$254,000 in comparison to budget and we have yet to account for possible expenditures of November and December storms should they occur. Since 1997, the average annual expenditure has been \$408,800 without TransLink and \$932,300 with TransLink. Our previous highest expenditure of \$1,260,300 was in 1996 when we had experienced several long duration storms. During that year, Council approved recommendations to begin snow-clearing operations in residential (Third Priority) streets, which significantly increased expenditures.

Over-expenditures are covered by the Winter Emergency Reserve with under expenditure funds used to replenish the reserve. The amount included in the 2007 budget covers the snow removal expenditures during an average year and will only need to be increased by the usual economic increases plus adjustments for the higher cost of salt purchases.

Winter 2006/07 Events

The winter of 2006/07 was an exceptionally severe year for weather when compared to the norm for the Lower Mainland and Surrey received heavier snowfall than the western portion of the GVRD.

Four major storms occurred from November 25, 2006 to March 2, 2007 with the highest snowfall in a 24-hour period occurring in the Cloverdale area where snow had accumulated to 600mm (24"). This amount of snowfall is unusual for the Surrey area.

From a road congestion perspective, the worst conditions resulted on the morning of January 10, 2007. Crews were brought in based on weather forecasts, which predicted snow at midnight. However, no snowfall was experienced until 5:00 a.m. at the beginning of rush hour. The preceding 5 hours (from midnight to 5:00 a.m.) crews patrolled their areas; however, since there was no snow or ice evident, no sand/salt materials were placed, as per the policy (placing sand and salt on bare dry pavement is ineffective as it simply blows off the road surface). The mix of snow and ice that impacted this area at 5:00 a.m. arrived without report from the weather office and rapidly accumulated on the road surface. The frozen snow quickly compacted under the tires of the rush hour traffic and created extreme icy driving conditions.

While the full complement of trucks were on the road at that time, gridlock quickly occurred, placing crews behind as heavy snowfall continued throughout the day resulting in a second gridlock situation for the afternoon rush hour. Crews were able to open major roads over night for improved conditions the next day.

Crews experienced further problems for the final snowstorm of the year due to a salt shortage in the region where the City's and other salt suppliers were unable to supply sufficient salt supply for the needs of Lower Mainland jurisdictions including Surrey. As a result, we resorted to using more sand and less salt for ice control.

The City typically uses salt for de-icing on our roads until temperatures drop to below -5°C at which time salt on its own becomes ineffective; therefore, sand is added. This usually keeps the volume of sand use to a minimum, which is desired as the cost of subsequently cleaning up sand from our roads in the early spring can be high.

The City normally uses between 4000 and 5,000 tonnes of salt over a winter season. In the 2006/07 winter, we used approximately 9,100 tonnes or 180% of our usual amount.

Currently, there are only two salt suppliers in the region and both were unable to meet the demand this past winter. In discussions with the suppliers, they require that municipalities commit to a fixed volume of salt (essentially a guaranteed purchase) or they proportion quantities based on estimates. We have since researched direct purchase in lieu of depending on local suppliers. However, in all cases we have been advised that Surrey's required quantity on its own is too small (in volume) for an independent purchase.

Increase in Salt Storage Capacity

To ensure that we have sufficient salt to cover our needs during future winter storm events, it is necessary to increase the City's salt storage capacity from 1,800 tonnes, to approximately 6,000 tonnes, which is close to our maximum usage under normal winter conditions, plus allowances for growth. To this end, it is being recommended that additional salt storage capacity be constructed at an estimated cost of \$325,000.

Increases in Snow and Ice Control Fleet

Appendix 3 shows the increase in snow removal fleet resources since 1996. The core fleet of tandem dump trucks with sanders and plows has increased from 9 in 1996 to 14 in 2006. This increase has occurred as replacement dump trucks are purchased and the older trucks are kept on just for winter maintenance. This process will further increase the fleet of tandem dump truck plows and sanders to 20 pieces of equipment by the end of 2007. The additional fleet size will help provide a faster response to snow storm events.

Additional Enhanced Level of Service

The City utilizes smaller four-wheel drive trucks with small sanders and plows to enter tight and hilly residential streets throughout the City. Recent development has resulted in more hillside residential areas, which are somewhat more risky to access with large snow removal equipment. It is recommended that the City purchase an additional three (3) of these smaller vehicles with sanders and plows at a one-time capital expenditure of \$225,000 to enhance the City's ability to address snow and ice removal on streets with steep grades throughout the City.

FUNDING

Capital funding for the proposed salt shed of \$325,000 and Capital funding for the additional three (3) one-ton sander/plow trucks (\$255,000) is available from annual one-time operational savings.

CONCLUSION

The City road network continues to grow. More frequent and heavier snowstorms in the winter of 2006/07 have raised questions about the current level of service being provided by the City in relation to snow removal as well as ways to enhance or improve these levels. Surrey has long been known for its excellent snow clearing. Ongoing scheduled increases in relation to equipment replacement and retention of old equipment will sufficiently increase our capacity to deal with our average snowfall years. It is recommended that we construct an additional salt storage shed to ensure that the City has sufficient salt on hand to last a winter season. Similarly, it is recommended that three additional smaller trucks be purchased for snow and ice removal.

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Appendix 1 – Snow and Ice Policy
Appendix 2 – Snow and Ice Control Maps
Appendix 3 – Snow and Ice Fleet
Appendix 4 – Comparison of Priorities for Snow Removal



CITY POLICY

No. H-22

REFERENCE:	APPROVED BY:	CITY COUNCIL
REGULAR COUNCIL MINUTES 28 JANUARY 1991 PAGE 5	DATE:	10 MARCH 1997 (RES. R97-622)
	HISTORY:	28 JANUARY 1991 14 JANUARY 1991 9 JANUARY 1978

TITLE: SNOW & ICE CONTROL

1. Sanding/Salting and Snow plowing operations shall be conducted according to the following priorities:
 - a) First Priority: Arterial roads, major collector roads, bus routes and hilly areas (regardless of road classification) are given first priority. Sanding and plowing are carried-out, around the clock, as long as poor conditions exist.
 - b) Second Priority: Secondary through roads in residential areas. These local roads exist between the arterial or major collector road grid. They are typically over 200 meters in length and connect local traffic with either an arterial or major collector roadway. All secondary priority work is performed during normal work hours only.
 - c) Third Priority: All remaining residential roads. Third priority routes will be only done as directed by the General Manger of Engineering or his delegate. The General Manager of Engineering shall inform Council of the decision to address third priority routes. These areas will be dealt with in a systematic manner starting with the more significant roads, hill areas, specific problem locations (as identified by the public and Area Managers). All third priority work is performed during normal work hours.

2. First priority routes are maintained until the conditions are under control; only then are resources redirected onto second priority routes. Surfaces shall be maintained as bare as possible through continued use of assigned personnel and equipment.

TITLE: SNOW & ICE CONTROL (2)

3. Once conditions are under control on secondary routes resources can be directed to third priority routes.
4. Third priority routes are only addressed under the direction of the General Manager of Engineering or his delegate.
5. As soon as conditions deteriorate on any of the previous priority routes, resources are moved back to those routes.
6. All sanding/salting and plowing operations with the exception of first priority routes are to be completed within normal working hours unless directed by the General Manager (or designate) of Engineering. First priority routes are addressed around the clock.
7. Snow removal and snow plowing occurs when the snow depth exceeds 10 centimeters (4 inches).
8. Snow removal from sidewalks is the responsibility of the adjacent property owners.

Snow and Ice Equipment

1996/97 Winter

- 9 - Tandem dump trucks with sanders and plows.
- 2 - Single axle trucks with sanders and plows.
- 3 - One-ton trucks with sanders and plows.
- 2 - Road graders (steep hills).
- 2 - Contract graders (steep hills).

2005/06 Winter

- 11 - Tandem dump trucks with sanders and plows.
- 1 - Tandem axle crane truck with sander and plow.
- 2 - Single axle trucks with sanders and plows.
- 3 - One-ton trucks with sanders and plows.
- 2 - Road graders (steep hills).
- 2 - Contract graders (steep hills).

2006/07 Winter

- 14 - Tandem dump trucks with sanders and plows.
- 1 - Tandem axle crane truck with sander and plow.
- 2 - Single axle trucks with sander and plow.
- 2 - Road graders (steep hills).
- 1 - Contract grader (steep hills) (second contract grader not available).

2007/08 Winter (without additions in report)

- 20 - Tandem dump trucks with sanders and plows.
- 1 - Tandem axle crane truck with sander and plow.
- 2 - Single axle trucks with sander and plow.
- 2 - Road graders (steep hills).
- 2 - Contract graders (steep hills) (if available).

APPENDIX 4

Comparison of Priorities for Snow Removal

	1 st	2 nd	3 rd
Surrey	Arterials Major Collectors Bus Routes Hills	Secondary roads through roads in residential areas	Remaining residential roads
Langley	Arterials Major Collectors Bus Routes	Secondary roads through roads in residential areas	Remaining residential roads
Vancouver	Arterials Major Collectors Bus Routes	Residential hills and bike routes	
Pitt Meadows	Arterial Roads	Collector roads	Residential roads
Richmond	Arterial Roads Bus Routes	Collector roads in industrial and residential areas	
Port Coquitlam	Arterial Roads Steep Hills School Zones	Bus Routes Collector Roads	Residential streets leading to subdivisions; Industrial side streets
Burnaby	Arterial Roads Bus Routes Collector Roads	Residential roads which are the only access point to a neighbourhood	Residential roads